ESTABLISHING A FULL RETENTION AND MONITORING PROGRAM IN THE SHORE-BASED PACIFIC WHITING FISHERY

IMPLEMENTING AMENDMENT 10 TO THE PACIFIC COAST GROUNDFISH FISHERY MANAGEMENT PLAN

PRELIMINARY DRAFT ENVIRONMENTAL ASSESSMENT

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Abstract: This preliminary Environmental Assessment (EA) provides an analysis of the effects of establishing a full retention and monitoring program in the Pacific whiting fishery off the coasts of Washington, Oregon, and California. A full retention program reduces discards in the Pacific Coast groundfish fishery by enabling the shore-based whiting fleet to land prohibited species as well as groundfish species taken in excess of cumulative trip limits. By allowing vessels to land unsorted catch at processing plants, a full retention program helps ensure quality whiting products by enabling catch to be placed in refrigerated seawater tanks immediately after capture. Additionally, full retention and monitoring will improve the ability of fishery management agencies to track the incidental catch of prohibited species (e.g., Pacific salmon) and overfished groundfish species (i.e., widow rockfish, darkblotched rockfish, Pacific ocean perch, canary rockfish, bocaccio, lingcod), as well as track the forfeiture and/or donation of groundfish caught in excess of Pacific Coast groundfish trip limits by the shore-based whiting fleet. This EA analyzes establishing a full retention and monitoring program in Federal regulation versus issuing exempted fishing permits (EFPs) and the effects of different types of monitoring programs on the socioeconomic, biological, and physical environment of the Pacific Coast groundfish fishery.

The purpose of this document is to discuss establishing a full retention and monitoring program in the Pacific Coast shore-based whiting fishery. At its September 8 - 12, 2003, meeting in Seattle, Washington, the Pacific Fishery Management Council (Pacific Council) reviewed a range of alternatives and recommended to NMFS that the range of alternatives be further developed before being made available for public review. In order to further engage Federal and State personnel and to involve industry in the development of alternatives, a meeting was held on December 8, 2003, in Newport, Oregon to further develop the range of alternatives. At its June 13-18, 2004, meeting in Foster City, California the Pacific Fishery Management Council (Pacific Council) will review this EA and, if appropriate, adopt a range of alternatives for public review. The Pacific Council is scheduled to select a preferred alternative at their September 12-17, 2004, meeting in San Diego, California. After the Pacific Council's September meeting, a proposed rule describing the proposed regulations and requesting public comment will be published in the Federal Register. After receiving public comment on the proposed rule, a final rule would establish a full retention and monitoring program prior to the April start of the 2005 primary whiting season. Establishing full retention and monitoring requirements in the shore-based whiting fleet will aid in sustainable management of Pacific Coast salmon and groundfish stocks while providing an important economic opportunity to those associated with the harvest, processing, and selling of whiting taken by the shore-based whiting fleet.

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1.0 PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

The groundfish fishery in the Exclusive Economic Zone (EEZ), offshore waters between 3 and 200 miles, off the coasts of Washington, Oregon, and California (WOC) is managed under the Pacific Coast Groundfish Fishery Management Plan (FMP). The Pacific Coast Groundfish FMP was prepared by the Pacific Fishery Management Council (Pacific Council) under the authority of the Magnuson Fishery Conservation and Management Act (subsequently amended and renamed the Magnuson-Stevens Fishery Conservation and Management Act). The Pacific Coast Groundfish FMP has been in effect since 1982.

Actions taken to amend FMPs or to implement regulations to govern the groundfish fishery must meet the requirements of several Federal laws, regulations, and executive orders . In addition to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), these Federal laws, regulations, and executive orders include: National Environmental Policy Act (NEPA), Regulatory Flexibility Act (RFA), Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), Coastal Zone Management Act (CZMA), Paperwork Reduction Act (PRA), Executive Orders (E.O.) 12866, 12898, 13132, and 13175, and the Migratory Bird Treaty Act.

The regulations that implement NEPA allow NEPA documents to be combined with other agency documents to reduce duplication and paperwork (40 CFR§§1506.4). Therefore, this EA will ultimately become a combined regulatory document to be used for compliance with not only NEPA but also E.O. 12866, RFA, and other applicable laws. NEPA, E.O. 12866, and the RFA require a description of the purpose and need for the proposed action as well as a description of alternative actions that may address the problem.

- Chapter One describes the purpose and need and general background of the proposed action.
- Chapter Two describes a reasonable range of alternative management actions that may be taken under the proposed action.
- Chapter Three contains a description of the socioeconomic, biological, and physical characteristics of the affected environment.
- Chapter Four examines the socioeconomic, biological, and physical impacts of the management options.
- Chapter Five provides a list of references for this document.
- An appendix with the 2004 shore-based whiting EFP and a pilot study of electronic monitoring in the shore-based whiting fishery is found in Chapter Six.

1.2 Summary of Proposed Action

The proposed action is to establish a full retention and monitoring program in the shore-based Pacific whiting (whiting) fishery in the EEZ off the coasts of Washington, Oregon, and California.

1.3 Purpose of and Need for Action

The need for establishing full retention and monitoring requirements in the shore-based whiting fishery is to meet requirements of and guidance from the Magnuson-Stevens Act, the Endangered Species Act, and Pacific Coast groundfish FMP.

The needs for the proposed action are as follows:

- Establish a standardized reporting methodology to assess the type and amount of bycatch occurring in the shore-based whiting fishery.
- Meet the terms and conditions of the "Section 7 Consultation - Biological Opinion: Fishing conducted under the Pacific Coast Groundfish Fishery Management Plan for California, Oregon, and Washington Groundfish Fishery" by accurately tracking salmon species incidentally taken in the shore-based whiting fishery and collecting morphological information from salmon species.
- Maintain the integrity of Pacific Coast groundfish rebuilding plans for overfished species by accurately tracking overfished species taken in the shore-based whiting fishery to manage the total mortality of overfished species.

The purpose of the proposed action is to manage the Pacific Coast groundfish fishery sustainably while providing an important economic opportunity to those associated with the harvest, processing, and selling of whiting taken by the shore-based whiting fleet.

The purposes of the proposed action are as follows:

- Establish a full retention program in the Pacific Coast groundfish fishery off the coasts of Washington, Oregon, and California by providing for the catching, retaining, and landing of all catch harvested by catcher vessels in the shore-based fishery for Pacific whiting.
- Reduce discard by allowing for the landing of prohibited species and groundfish taken in excess of cumulative trip limits and accurately tracking the forfeiture and/or donation of these fish to state or charitable donation agencies.
- Develop a monitoring program to achieve an adequate level of sampling for a full retention shore-based whiting fishery. This monitoring program will also serve as a template for monitoring in future potential Pacific Coast multi-species full or increased retention groundfish fisheries.

1.4 Background to the Purpose and Need

To provide for the conservation and management of fisheries, the Magnuson-Stevens Act specifies requirements for fishery management plans. One of the required provisions for fishery management plans is to establish a standardized reporting methodology to assess the type and amount of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable, minimize bycatch (Section 303(a)(11)). Establishing a full retention program in the Pacific Coast groundfish fishery as well as an associated monitoring program would satisfy the Magnuson-Steven Act standardized reporting methodology requirement for the shore-based whiting fishery. Additionally, a full retention program would reduce discard in the shore-based whiting fishery by allowing for the landing of prohibited species and groundfish taken in excess of cumulative trip limits and accurately tracking the forfeiture and/or donation of these fish to state or charitable donation agencies.

The need for full retention and monitoring in the shore-based whiting fishery is also linked to the FMP and Federal regulatory requirements surrounding the treatment and disposition of prohibited species and groundfish taken in excess of cumulative trip limits by Pacific Coast trawl fisheries.

- In section 6.5.2.2 "Catch Restrictions" of the groundfish FMP, it specifies that salmon caught in trawl nets are classified as a prohibited species. As specified under Federal regulation at 50 CFR 660.306 and in section 6.5.5.4 "Prohibited Species" of the groundfish FMP, salmon captured in trawl nets and brought aboard must be returned to the sea as soon as practicable, after allowing for sampling by an observer, with a minimum of injury (PFMC 2002). [Note: Because of the high mortality rate for trawl caught salmon, all salmon discards are presumed dead.]

- In section 6.6.2 "Net Prohibition" of the salmon FMP, it specifies that the use of nets to capture salmon, with the exception of a hand-held net used to lift hooked salmon on board a vessel, is prohibited (PFMC 2003).

- Under Federal regulation at 50 CFR 660.306, the taking, retaining, possessing, or landing of groundfish in excess of cumulative trip limits is prohibited without an exempted fishing permit.

Trawl fisheries regulated by the Pacific Coast groundfish FMP include those using either bottom trawl gear, a type of gear routinely fished with the footrope in contact with the ocean floor, or those using midwater trawl gear, a type of gear that is routinely fished above the ocean floor. In general, bottom trawl gear is used to harvest flatfish, rockfish, and some roundfish species while midwater trawl gear is primarily used to capture whiting or pelagic rockfish.

Relatively low numbers of salmon are incidentally taken during trawl fishing operations for groundfish. Between September 2001 and August 2002, 9,413 lbs of salmon were incidentally taken by the limited entry groundfish trawl fleet with observer coverage during that period (about 10% of landings) off the Pacific Coast (NMFS 2003). The incidental capture of salmon is

generally a rare event with most tows containing no salmon and a few tows containing many salmon. Variation in the incidental take of salmon appears to be influenced by the time of year, area, depth of fishing, and general salmon abundance. Knowledge of these variations shared between fishers can sometimes be used to help limit the incidental take of salmon in the groundfish fishery, especially in the whiting fishery. Because of the timing and location of the whiting fishery, the salmon species predominantly taken in the fishery is chinook. Pink, chum, and coho salmon may also contribute to a significant proportion of the catch in the midwater trawl fishery, depending on the year and location of the fishery. In 2003, 2,872 individual salmon were incidentally taken in the non-tribal whiting fishery (at-sea and shore-based sectors combined).

The 1992 Biological Opinion analyzing the effects of the Pacific Coast groundfish fishery on salmon stocks listed under the ESA, requires the Pacific Council to provide for monitoring of the salmon incidentally taken in the midwater trawl whiting fishery but not in the bottom trawl fishery (NMFS 1992). Gear is fished within the water column in the midwater trawl whiting fishery and it is fished near and/or on the ocean floor in the bottom trawl fishery. Because salmon are most often present in the water column, as opposed to being associated with the ocean floor, and because there is a spatial/temporal overlap between the whiting fishery and salmon distribution, there is an opportunity to incidentally take more salmon in the whiting fishery than in the bottom trawl fishery. For the bottom trawl fishery, the Pacific Council must provide an annual summary that characterizes that fishery and which can be used to assess any changing trends in that fishery that may jeopardize a listed salmon stock. Currently, the need for monitoring in the whiting fishery is based on not jeopardizing the existence several salmon species listed under the ESA, including the Snake River fall chinook, lower Columbia River chinook, upper Willamette River chinook, and Puget Sound chinook (NMFS 2002). Monitoring needs could change if additional salmon species are listed or additional incidental take data are needed for other management purposes.

The whiting stock is the most abundant of any managed fishery resource off the coasts of Washington, Oregon, and California. Whiting landings in 2002 represented approximately 84% of the total groundfish landings by weight for the year (PacFIN 2003). The primary value of whiting lies in its conversion to a protein paste known as "surimi" which is used as the base for many analog products such as imitation crab, shrimp, and scallops. The conversion of fish flesh to an acceptable quality of surimi is highly dependent on the freshness of the raw product and demands careful handling and immediate cooling or processing to be economically feasible. Processing of whiting into surimi is more critical than with some other fish species because whiting contains a parasite that releases an enzyme that begins to soften the flesh of the fish soon after it dies. Rapid cooling of the whiting catch can retard this deterioration should whiting need to be stored for any duration prior to processing (PFMC 1996).

At present, the whiting fishery consists of at-sea and shore-based components. In the at-sea fishery, the trawl nets are emptied on the deck of either a mothership or catcher-processor, the catch is sorted, and the whiting are quickly processed to retain freshness and prevent loss of quality. During this time, incidentally caught salmon can be removed from the catch by an observer, either on deck or during processing of the catch, counted, and thrown overboard.

Therefore, owing to vessel configuration and 100 % observer coverage aboard motherships and catcher-processors, disposition of the salmon incidentally taken with midwater trawl gear by the at-sea whiting fleet satisfies the requirements of both the salmon and groundfish FMPs. In the shore-based fishery, catcher vessels must store the whiting, for up to several hours as they transit from the fishing grounds to shore-based plants where the fish are processed. In this situation, it is imperative for the catch to be cooled as rapidly as possible, often by immediately emptying the contents of the trawl net into refrigerated seawater holds below deck, to retain product freshness and quality. The shore-based fleet's rapid dumping of catch into refrigerated seawater holds below deck precludes immediate sorting, sampling, and removing prohibited species from the catch. Consequently, this handling of salmon species and groundfish species taken in excess of cumulative trip limits by the shore-based whiting fleet is not in accordance with the Pacific Coast salmon or groundfish FMPs or under Federal regulation at 50 CFR 660.306.

The sorting, sampling, and immediate release of salmon incidentally taken in the whiting fishery is possible for the at-sea component of the fishery, but it is not practical for the shore-based component of the whiting fishery because of their need to rapidly cool the fish in refrigerated seawater holds to preserve freshness and quality. As a temporary means to meet the monitoring requirements of the 1992 Biological Opinion and allow for efficient utilization of the whiting resource, the Pacific Council implemented an exempted fishing permit (EFP) process for the shore-based component. Through the initial use of on-board observers and the continued use of dock-side monitors, this EFP process authorized the retention of incidentally caught salmon in the shore-based whiting fishery until the catch is sorted at the processing plant. At the plants, incidentally taken salmon are counted, sampled, and either forfeited to the state or donated to charitable institutions. As defined at 50 CFR 679.6, EFPs authorize fishing for groundfish in a manner that would otherwise be prohibited for limited, experimental purposes. Thus, EFPs are intended to provide for limited testing of a fishing strategy, gear type, or monitoring program that may eventually be implemented on a larger fleet-wide scale and are not a permanent solution to the monitoring needs of the shore-based whiting fishery. Because of the success of the shore-based whiting EFP, indicating that it is feasible to retain and monitor the incidental take of salmon in the shore-based whiting fishery, it is now appropriate to establish full retention and monitoring requirements for salmon and other non-target species incidentally taken in the shore-based whiting fishery in Federal regulations.

The harvest of Pacific Coast groundfish species is managed under a cumulative trip limit system. Trip limits are the specified quantity of groundfish that can be taken, retained, possessed, or landed on either a daily, weekly, monthly, or two month schedule. Because non-whiting species are sometimes captured during directed fishing for whiting and because sorting catch at sea is difficult for the shore-based whiting fleet, adherence to a trip limit management regime is not practical for the shore-based whiting fleet. In the fall of 2001, the West Coast Groundfish Observer Program (Observer Program) was implemented in the Pacific Coast groundfish fishery. The purpose of the Observer Program is to provide accurate accounts of total catch, bycatch, and discard under the cumulative trip limit management system. Vessels with limited entry permits carry observers on a random schedule and the Observer Program's initial goal was to provide coverage so that fishing was observed for approximately 10% of the limited entry trawl fleet's coastwide landings (NMFS 2003). Because of the shore-based whiting fleet's difficulty with

sorting catch at sea, vessels have been allowed to take, retain, possess, and land groundfish species taken in excess of groundfish cumulative trip limits through the EFP process. Without an EFP, shore-based whiting vessels would be prohibited from retaining and landing groundfish in excess of trip limits under Federal regulation at 50 CFR 660.306. These vessels would be required to sort their catch at sea, risking deteriorating the flesh quality of their targeted catch, whiting. Through the EFP process, the shore-based whiting fishery has been acting as a full retention fishery. Because the Observer Program is not designed to provide coverage for a full retention fishery, the shore-based whiting fishery needs a monitoring program designed to provide the higher level of coverage necessary to monitor compliance with full retention requirements.

In addition to tracking salmon incidentally taken in the shore-based whiting fishery, NMFS's obligations to rebuild overfished groundfish species require accurate tracking of catch in the shore-based whiting fishery. There are currently eight overfished groundfish species along the Pacific Coast and at least six of these species (widow rockfish, darkblotched rockfish, Pacific ocean perch, canary rockfish, bocaccio, and lingcod) are incidentally taken in the shore-based whiting fishery. In 2003, the incidental catch of overfished species was as follows: 8,970 kg of widow rockfish, 110 kg of canary rockfish, 300 kg of Pacific ocean perch, 400 kg of lingcod, and 260 kg of darkblotched rockfish (Wiedoff et al. 2003). The take of these species by the shore-based whiting fleet should be closely tracked for two reasons. Underestimating the total mortality of overfished species could result in harvest levels exceeding the rebuilding optimum yields (OYs) for those species, potentially slowing the rebuilding of those stocks. Conversely, overestimating the catch of overfished species by the shore-based whiting fleet could result in other sectors of the Pacific Coast groundfish fishery being unnecessarily constrained in order to limit the total catch of overfished species.

Currently, there is no at-sea monitoring of shore-based whiting vessels to verify whether all catch is retained and/or to document the frequency of catch being dumped at sea. In addition to tracking the salmon taken in the whiting fishery, it is NMFS' responsibility to assure, with a reasonable degree of confidence, that our management actions are consistent with overfished species rebuilding plans. Incidental catch of widow rockfish, canary rockfish, darkblotched rockfish and Pacific ocean perch is of particular concern with the shore-based whiting fishery. Both NMFS and State agency personnel have heard reports that trawl nets containing higher than average quantities of non-whiting species are sometimes discarded at sea. While NMFS has classified these reports as "anecdotal", the incentive to discard non-whiting catch certainly exists. In individual fishing quota (IFQ) managed fisheries, if catch of one or more species reaches its limit before the limits of other jointly harvested species are achieved, there is incentive to discard at sea (Squires et al. 1998). Similarly, this discarding behavior has been observed in other full retention, limited catch fisheries (Annala 1996, Dewees 1992 (as referenced by Squires et al. 1998)). Because rockfish spines damage whiting product (Clucas 1997) as well as the tubing used by processing plants to offload shore-based catcher vessels (S. Parker, ODFW Biologist, personal communication, February 2004), there are additional incentives to not place rockfish in the refrigerated seawater tanks with whiting. There are thus strong economic incentives to discard catch of non-whiting species, especially overfished rockfish species, at sea. NMFS believes there is cause to document whether this behavior is

occurring in the shore-based whiting fishery and to encourage vessels to more carefully target whiting with a full retention requirement.

Additionally, as both state and Federal agencies are experiencing budget reductions that affect the presence of enforcement personnel and dock-side samplers in and around processing plants, it is important to closely monitor what becomes of groundfish taken in excess of cumulative trip limits. Because of the shore-based whiting fleet's difficulty with sorting catch at sea, they have been able to take, retain, and land groundfish species taken in excess of groundfish cumulative trip limits through the EFP process. Groundfish taken in excess of trip limits are either forfeited to state agencies or donated to charitable agencies. Whether these fish are forfeited to the state or surrendered as charitable donations, a monitoring system is necessary to track these activities. The proposed action is to implement a permanent monitoring program that provides for a full retention opportunity in the shore-based whiting fishery. The different monitoring programs for the shore-based whiting fishery analyzed in this EA are based on the existing monitoring program for shore-based whiting EFP. The programs analyzed are intended to meet the coverage needs of a full retention fishery and will aid in the sustainable management of Pacific Coast salmon and groundfish stocks.

1.5 Environmental Review Process

The purpose of the environmental review process is to determine the range of issues that the NEPA document (in this case the EA) needs to address. The environmental review process is intended to ensure that problems are identified early and properly reviewed, that issues of little significance do not consume time and effort, and that the draft NEPA document is thorough and balanced. The environmental review process should: identify the public and agency concerns; clearly define the environmental issues and alternatives to be examined in the NEPA document; eliminate non-significant issues; identify related issues; and identify state and local agency requirements that must be addressed.

1.5.1 Public Scoping

To address the treatment and disposition of salmon in the groundfish trawl fisheries, specifically the shore-based component of the whiting fishery, an EA to amend both the groundfish and salmon FMPs was drafted in 1996 by Pacific Fishery Management Council (PFMC) staff. These FMP amendments were respectively numbered 10 for groundfish and 12 for salmon. The 1996 EA analyzed two management measures (alternatives) regarding the retention of salmon taken with groundfish trawl gear. The first alternative (status quo) was to maintain the then current salmon and groundfish FMPs, under which, retention of salmon in the groundfish trawl fisheries would not have been permitted and the practice of retaining salmon in the shore-based whiting fishery was only authorized as a temporary experimental measure under the authority of the EFP process. The second alternative (preferred alternative) maintained salmon as a prohibited species in the groundfish FMP. However, it added trawl gear to the list of gears that may retain salmon if allowed under other pertinent regulations (such as salmon fishing regulations at 50 CFR Part 660, Subpart H). Under the second alternative, the salmon FMP would be amended to allow retention of salmonids in the trawl fishery, when a Pacific Council approved monitoring

program, one that meets certain minimum guidelines, was established in the shore-based whiting fishery (PFMC 1996). At their October 21 - 25, 1996, meeting in San Francisco, California, the Pacific Council discussed the retention of salmon in groundfish trawl fisheries, specifically the shore-based whiting fishery, and took final action implementing the preferred alternative to maintain a viable shore-based whiting fishery while using EFPs to temporarily monitor the incidental take of salmon until a permanent monitoring program could be implemented. Interested members of the public had the opportunity to comment on the retention of salmon in groundfish trawl fisheries at that same meeting in San Francisco, California.

In keeping with the Pacific Council's recommendation, to maintain a viable shore-based whiting fishery using EFPs to temporarily monitor the incidental take of salmon until a Pacific Council approved monitoring and disposition program is established, NMFS is proceeding with establishing a full retention and monitoring program in the shore-based whiting fishery.

On April 18, 2003, NMFS Northwest Region staff met with Northwest Fisheries Science Center (NWFSC) and West Coast Observer Program (Observer Program) staff to discuss establishing full retention and monitoring in the shore-based whiting fishery. Meeting discussion focused on what types of monitoring would be appropriate for the shore-based whiting fishery, what NWFSC and Observer Program resources, if any, would be available for monitoring the shore-based whiting fishery, and identifying an Observer Program staff member available to serve as a contact individual for the development and implementation of a shore-based whiting monitoring program.

On May 22, 2003, NMFS Northwest Region staff met with staff from Washington Department of Fish and Wildlife (WDFW), Oregon Department of Fish and Wildlife (ODFW), and California Department of Fish and Game (CDFG) to discuss implementing a monitoring program for the shore-based whiting fishery. The meeting discussion focused on identifying state issues and concerns associated with different types of full retention monitoring systems and identifying a contact individual from each state for the development and implementation of a monitoring system in shore-based whiting fishery.

NMFS brought a preliminary EA before the Pacific Council at their September 8 - 12, 2003, meeting in Seattle, Washington. At that time, the Pacific Council recommended that the range of alternatives be further developed. In keeping with the Pacific Council's recommendation that the range of alternative be further developed prior to public review, NMFS held a public scoping meeting on December 8, 2003, in Newport, Oregon to further engage Federal and State personnel and to involve industry in the development of alternatives. NMFS Northwest Region staff met with staff from WDWF, ODFW, and CDFG as well as individuals from Archipelago Marine Research Ltd and the shore-based whiting industry to discuss full retention and monitoring in the shore-based whiting fishery. Archipelago Marine Research Ltd is a world leader in the field of fisheries monitoring and marine environmental assessment. Based in Victoria, British
Columbia, Archipelago has been providing marine biological services since 1978. Additionally, NMFS and Archipelago staff have been attending ODFW's mandatory meetings for participants in the 2004 shore-based whiting EFP (May 6, 2004 in Charleston, Oregon; May 10, 2004 in

Newport, Oregon; May 18, 2004 in Astoria, Oregon) to further discuss the range of alternatives with state personnel and the shore-based whiting industry. These meetings generated fruitful discussion on the range of alternatives and have helped shape the range of alternatives presented and analyzed in this EA.

At its June 13-18, 2004, meeting in Foster City, California, the Pacific Fishery Management Council (Pacific Council) will review this EA and, if appropriate, adopt a range of alternatives for public review. The Pacific Council is scheduled to select a preferred alternative at its September 12-17, 2004, meeting in San Diego, California.

1.5.2 Issues and Concerns Raised Through Scoping

While the initial purpose of the proposed action was to develop and implement a monitoring program for the treatment and disposition of incidentally taken salmon in the shore-based whiting fishery, the importance of establishing full retention and monitoring options to reduce bycatch and to track multiple aspects of the shore-based whiting fishery became apparent through the scoping process.

Issues and concerns identified by staff from the NWFSC and Observer Program staff on April 18, 2003, include the following:

- the merits of a full retention program;
- allowing discard at sea would require observers/monitors to be aboard shore-based vessels;
- placing Federal observers aboard shore-based delivery vessels is an inefficient use of resources;
- perhaps this shore-based fishery is a candidate for testing hard bycatch caps;
- video cameras may have insurance/liability concerns for industry;
- and valuable data could be collected dock-side but logistics of port sampling is difficult for the Observer Program.

Issues and concerns identified by staff from state (Washington, Oregon, and California) agencies on May 22, 2003, include the following:

- the relative economic importance of the shore-based whiting fishery varies by state;
- the resources available to implement a monitoring program differ by state;
- the monitoring program should be relatively consistent across states and build on the existing EFP monitoring infrastructure;
- currently monitoring is funded by industry, NMFS, and the states;
- there should be port specific market values for overage fish;
- the monitoring program could use a "penalty box" concept (required withdrawl from the fishery for excessive bycatch); and
- the monitoring program could implement individual vessel bycatch caps.

Issues and concerns identified by staff from state agencies, individuals involved in the shore-based whiting industry, and staff from Archipelago Marine Research Ltd. during the December 8, 2003, meeting include the following:

- identifying the need for discontinuing the annual issuing of EFPs for this fishery;
- the importance of having industry support any type of monitoring program;
- identifying the need for verifying full retention of catch taken by shore-based whiting fleet;
- identifying appropriate monitoring levels;
- analyzing the shore-based whiting fleet's ability to fund a monitoring program;
- implementing a monitoring program that would be appropriate for IFQs;
- including a provision that allows shore-based whiting fleet to sort their catch at sea;
- including the option of Federal, State, and/or Industry funding for the full range of alternatives; and
- improving cost estimates for the range of alternatives.

Issues and concerns identified by industry during ODFW's mandatory meetings for participants in the 2004 shore-based whiting EFP include:

- what is the definition of full retention;
- are vessels responsible to ensure that money for overages are handled appropriately;
- data confidentiality and privacy rights concerning electronic monitoring need to be clear and designed to protect vessel owner/operators;
- vessel owner/operators should have access to electronic monitoring images collected aboard their vessels; and
- the cost of full retention monitoring programs are expensive for the shore-based whiting fishery.

1.6 Decision to be Made

From the information in this EA, the Regional Administrator of NMFS, Northwest Region must decide how best to establish a full retention and monitoring program in the shore-based whiting fishery. The Regional Administrator must also determine if the proposed action and/or preferred alternative would or would not be a major Federal action, significantly affecting the quality of the human environment. If the Regional Administrator determines that the proposed action would not significantly affect the quality of the human environment, then a Finding of No Significant Impact (FONSI) may be prepared and a full retention and monitoring program may be implemented in the shore-based whiting fishery. If the Regional Administrator determines that the action would significantly affect the Pacific Coast groundfish fishery, then preparation of an Environmental Impact Statement will be required.

1.7 Applicable Federal Permits, Licences, or Authorizations Needed in Conjunction with Implementing this Proposal

No additional Federal permits, licences, or authorizations are needed to implement a monitoring program in the shore-based whiting fishery.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Introduction

This chapter describes the different full retention and monitoring programs or alternatives that may be established in the shore-based whiting fishery to meet the purpose and need of the proposed action. When deciding what type of a monitoring system is appropriate for the shore-based whiting fishery, the advantages and disadvantages associated with four different components of a full retention monitoring program in the shore-based whiting fishery and four different full retention monitoring options for the shore-based whiting fishery should be considered.

The four different components of a monitoring program for shore-based whiting fishery that should be considered are:

- % establishing full retention and monitoring;
- % verifying full retention of catch,
- % sampling for prohibited and overfished species at the processing plants where catch is delivered, and
- % tracking the overage/donation fish and the money paid for these fish.

These four different components of the shore-based whiting fishery are termed "issues" in this EA.

The four different monitoring options to provide for a full retention and monitoring are:

- % no full retention and monitoring,
- % the EFP process,
- % a Federal monitoring program, and
- % a combination monitoring program.

These four different monitoring options are referred to as the "alternatives" in this EA. The relationship between the issues and alternatives is explored in this EA.

2.2 Development of Alternatives and How the Alternatives are Structured

As discussed in Chapter One, because of Magnuson-Stevens Act requirements, the 1992 Biological Opinion analyzing the effects of the groundfish fishery on salmon stocks listed under the ESA, and requirements of the Pacific Coast groundfish FMP, a full retention and monitoring program is needed in the shore-based whiting fishery (NMFS 1992; PFMC 2002).

The issue of salmon retention in the groundfish trawl fisheries has already been brought before the Pacific Council in 1996 in the form of Amendment 10 to the Pacific Coast Groundfish FMP. Based on the EA drafted to analyze Amendment 10, the Pacific Council recommended that the EFP process be used temporarily until a permanent monitoring program could be developed and implemented in the shore-based whiting fishery. The Pacific Council also recommended that both the groundfish and salmon FMPs be amended to allow the retention of salmon in certain

groundfish trawl fisheries if accompanied by an approved monitoring program (PFMC 1996). Analysis of the alternatives will weigh the effects of establishing full retention and monitoring requirements on the human environment. For the purpose of this analysis, the human environment is defined as the Pacific Coast groundfish fishery. To meet the requirements of the Federal law and the Groundfish and Salmon FMPs, the preferred alternative should establish full retention and monitoring requirements while adequately providing for full retention catch verification, sampling of prohibited and overfished species at the processing plants where catch is delivered, and tracking of overage/donation fish and the money paid for these fish.

2.3 Alternatives Eliminated from Detailed Study

There is an issue relevant to the retention of salmon in groundfish trawl fisheries and the shore-based whiting fleet that was not analyzed in this EA that relates to the treatment and disposition of salmon in groundfish trawl fisheries. Currently, the salmon FMP prohibits the use of nets to capture salmon, and the groundfish FMP classifies salmon caught in trawl nets as a prohibited species (NMFS 2003; NMFS 2002). Therefore, salmon taken in trawl nets and brought aboard must be returned to the sea as soon as practicable, after allowing for sampling by an observer, with a minimum of injury. Both FMPs could be amended to allow retention of salmon with groundfish trawl gear without developing and implementing a monitoring program for the shore-based whiting fleet. However, based on the analysis in the 1996 Amendment 10 EA, the Pacific Council recommended revising both FMPs only after a Pacific Council approved monitoring program was developed and implemented in the shore-based whiting fishery (PFMC 1996). Allowing salmon retention without a monitoring program would make it difficult to track the amount of salmon incidentally taken in the shore-based whiting fishery. Additionally, allowing retention of salmon in groundfish trawl fisheries would likely create incentives for groundfish fishers to target salmon, making it increasingly difficult for NMFS to manage for sustainable fisheries. Therefore, this action will not consider further revisions to either the salmon and groundfish FMPs without first implementing a monitoring program in the shore-based whiting fishery because doing so would not be in accordance with the need of the proposed action. This need includes establishing a standardized reporting methodology to assess the type and amount of bycatch occurring in the shore-based whiting fishery, accurately tracking the amount of salmon and overfished groundfish species incidentally taken in the shore-based whiting fishery.

Once a range of alternatives that met the purpose and need of the proposed action was developed through public scoping, one option under those alternatives was dismissed as not being viable. The option dismissed as not being viable, and, therefore, not analyzed in this EA, was exploring a range of monitoring levels for verifying full retention of catch in the shore-based whiting fishery. After discussions with staff from the West Coast Groundfish Observer Program and NMFS National Observer Program, NMFS decided that a level of 100% monitoring (i.e., all shore-based whiting vessels would be monitored for compliance with full retention requirements throughout their trips) was the only monitoring level that was appropriate for accurately documenting compliance with full retention. Additionally, the catch of prohibited species and overfished species are rare and intermittent in the shore-based whiting fishery, therefore, any discarding at sea of these species would also be rare and intermittent. As only high levels of monitoring are appropriate for documenting rare and intermittent events, NMFS's decision to

only consider a level of 100% monitoring for verification of full retention is further supported.

2.4 No Action Alternative

Alternative 1 (No Action Alternative): There would be no provisions for full retention in the shore-based whiting fishery. Therefore, the vessels would be subject to the groundfish trawl cumulative trip limits and would be required to sort their catch at sea. Monitoring for the shore-based whiting fleet would be specified in the Observer Program's coverage plan for the groundfish trawl fleet and would be Federally funded. Vessels would be randomly selected to carry a groundfish observer. Once a vessel was selected, the vessel would be required to carry a groundfish observer to collect data on total catch, bycatch, and discard under the cumulative trip limit management system. Requiring the shore-based fleet to discard all incidentally taken salmon as well as all groundfish taken in excess of trip limits would increase discard in the shore-based fishery and would eliminate the opportunity for prohibited species and overages to be donated to charitable food banks. Sorting catch on deck would likely compromise the freshness and quality of the whiting, due to the enzyme released by a whiting parasite that softens the flesh soon after death, diminishing the market value of the fish and, perhaps, rendering the catch valueless. Eliminating donations to local food banks and diminishing the value of whiting may have economic impacts for those who participate in the fishery and for coastal communities and business that rely on the shore-based whiting harvest.

2.5 Alternatives

Alternative 2 (Status Quo): The annual process of issuing EFPs to participants in the shore-based whiting fleet to would continue as it has for over a decade. The EFPs would specify the full retention and monitoring requirements and participating vessels would to land incidentally taken prohibited species and groundfish taken in excess of cumulative trip limits. However, EFPs are intended to provide for limited testing of a fishing strategy, gear type, or monitoring program that may eventually be implemented on a larger, fleet-wide scale and not for the long-term purpose of providing a harvest opportunity which may otherwise be prohibited. Terms and conditions of the EFPs would be similar to the terms and conditions of years past, but they may be modified to reflect new issues or concerns in the shore-based whiting fishery. [See appendix for a 2004 shore-based whiting EFP.] The EFP process would continue to be funded by the shore-based whiting industry along with state and federal management agencies.

Alternative 3 (Federal Monitoring): Full retention and monitoring requirements for the shore-based whiting fishery would be specified in Federal regulation, and monitoring would be conducted by the Federal government. Overage and donation fish would be forfeited to the state in which catch was landed. Federal enforcement personnel would track overage/donation fish and the money paid for those fish.

Issue A: Observer Program observers would monitor the harvesting aspect of the shore-based whiting fishery. Observers would monitor 100% of all shore-based whiting trips. While aboard the vessel, observers would verify whether the vessel retained all its catch or if any catch was discarded at sea. If catch was discarded at sea, observers would estimate catch quantity and species composition. Observers could also collect sighting/interaction data for marine mammals and seabirds.

Option 3A(1): Monitoring of the shore-based whiting trips would be Federally funded. However, the Observer Program only has a limited number of observers. During the whiting primary season (April - July), few observers would be available to provide observer coverage in other sectors of the groundfish fishery. In 2003, the Observer Program deployed approximately 40 observers and participation in the shore-based whiting fishery included 35 shore-based catcher vessels and 9 processing plants.

Option 3A(2): Monitoring of the shore-based whiting trips would be industry funded through a no cost contract. Under a no cost contract, shore-based whiting vessels would pay the costs associated with a groundfish observer collecting data aboard their vessel (e.g., salary, travel) into an "observer fund" managed by the Federal government. This observer fund would be used to contract independent observer providers to supply the shore-based whiting fleet with groundfish observers. As with Option 3A(1), observer training, certification, and data collection would be controlled by NMFS.

Issue B: Observer Program observers would also monitor the dock-side aspect of the shore-based whiting fishery. At the processing plants, observers would sample salmon and overfished groundfish species incidentally taken in the shore-based whiting fishery. Based on an observer coverage plan designed to achieve an adequate level of sampling, between 10% - 50% of whiting deliveries would be sampled. The groundfish FMP addresses observers placed on vessels but does not address observers placed at processing plants. Therefore, regulatory language would need to be developed for observer protocol at plants, and the plants' responsibilities to observers.

Option 3B(1): Like Option 3A(1), monitoring of the shore-based whiting deliveries would be Federally funded.

Option 3B(2): Monitoring of the shore-based whiting deliveries would be funded by each state.

Option 3B(3): Like Option 3A(2), monitoring of the shore-based whiting deliveries would be funded by industry through a no cost contract.

Alternative 4 (Combination Monitoring): Full retention and monitoring requirements for the shore-based whiting fishery would be specified in Federal regulation and monitoring would be a combination of electronic monitoring, Federal observers and/or state monitors, and Federal and/or state enforcement personnel. Overage and donation fish would be forfeited to the state in which catch was landed. Federal and state enforcement personnel would share the tracking of overage/donation fish and the money paid for those fish.
Issue A: Electronic monitoring would cover 100% of the shore-based whiting trips and would be

used to verify full retention. Electronic monitoring equipment is automated equipment to provide accurate, timely, and verifiable fisheries data at a lower cost than that provided by an at-sea observer. The electronic monitoring system integrates an assortment of available electronic components with a software operating system to create a data collection tool. The system operates on either DC or AC voltage and autonomously logs video and vessel sensor data during the fishing trip. The system automatically restarts and resumes program functions following power interruptions. The electronic monitoring system is designed to independently monitor fishing activities on the vessel (McElderry et al. 2002). Electronic monitoring has been tested in various fisheries, including the shore-based whiting fishery, and has been able to address specific fishery monitoring objectives. Because electronic monitoring is a relatively new technology, standards for data confidentiality and privacy issues are still being developed for this type of monitoring. The installation, maintenance, and data analysis necessary for implementing an electronic monitoring system would likely be contracted out to a private company.

Option 4A(1): Electronic monitoring of the shore-based whiting trips would be Federally funded. Electronic monitoring providers would be contracted by NMFS to handle electronic monitoring installation, maintenance, and data analysis. All electronic monitoring data would be owned by NMFS.

Option 4A(2): Electronic monitoring of the shore-based whiting trips would be industry funded through a no cost contract. Under a no cost contract, shore-based whiting vessels would pay the costs associated with electronic monitoring aboard their vessel (e.g., leasing a camera, maintenance, data analysis) into an "electronic monitoring fund" managed by the Federal government. This observer fund would be used to contract independent electronic monitoring providers to handle all aspects of electronic monitoring in the shore-based whiting fishery. As with Option 4A(1), all electronic monitoring data would be owned by NMFS.

Issue B: Observer program observers and/or state samplers would monitor the dock-side aspect of the shore-based whiting fishery. At the processing plants, observers and/or samplers would sample salmon and overfished groundfish species incidentally taken in the shore-based whiting fishery. Based on the appropriate level of sampling, between 10% - 50% of whiting deliveries would be sampled.

Option 4B(1): Like Option 3A(1), monitoring of shore-based whiting deliveries would be Federally funded.

Option 4B(2): Monitoring of the shore-based whiting deliveries would be funded by each state.

Option 4B(3): Like Option 3A(2), monitoring of the shore-based whiting deliveries would be funded by industry through a no cost contract.

2.6 Comparison of the Alternatives

Table 2.6.1. A comparison of different full retention and monitoring programs for the shore-based whiting fishery.

Issues	Alternative 1 (No Action Alternative)	Alternative 2 (Status Quo)	Alternative 3 (Federal Monitoring)			Alternative 4 (Combination Monitoring)		
Establishing Retention and Monitoring Requirements	* Shore-based whiting fishery would operate under cumulative trip limits specified in Federal regulation.	* Full retention and monitoring requirements would be specified in an EFP issued on an annual basis.	* Full retention and monitoring requirements would be specified in Federal regulation.			* Full retention and monitoring requirements would be specified in Federal regulation.		
Verifying Full Retention of Catch	* Shore-based vessels would sort their catch at sea and discard all prohibited species as well as groundfish taken in excess of cumulative trip limits.	* There would be no monitoring for shore-based whiting trips to verify full retention of catch versus discard at sea.	* Federal observers would monitor for full retention versus discard at sea.			* Electronic monitoring would monitor for full retention versus discard at sea.		
			Option 3A(1)	**Option 3A(2)**		**Option 4A(1)**	**Option 4A(2)**	
			* Monitoring program would be Federally funded.	* Monitoring program would be funded by the shore-based whiting fleet through a no cost contract.		* Monitoring program would be Federally funded.	* Monitoring program would be funded by the shore-based whiting fleet through a no cost contract.	
Sampling Prohibited and Overfished Species	* Shore-based whiting vessels would be subject to observer monitoring under the West Coast Groundfish Observer Program's trawl fleet coverage plan. * Monitoring would be Federally funded.	* State port samplers would track and sample salmon and overfished groundfish species at processing plants funded by the shore-based whiting industry and state and Federal management agencies.	* Federal observers would sample salmon and overfished groundfish species at processing plants.			* Federal observers and/or state samplers would sample salmon and overfished groundfish species at processing plants.		
			Option 3B(1)	**Option 3B(2)**	**Option 3B(3)**	**Option 4B(1)**	**Option 4B(2)**	**Option 4B(3)**
			* Monitoring would be Federally funded.	* Monitoring would be funded by each state.	* Monitoring would be funded by the shore-based whiting industry through a no cost contract.	* Monitoring would be Federally funded.	* Monitoring would be funded by each state.	* Monitoring would be funded by the shore-based whiting industry through a no cost contract.
Tracking Disposition of Overage/Donation Fish	* No tracking of overage/donation fish would be necessary as catch of those species would be discarded at sea.	* State and Federal enforcement staff would share the tracking of overage/donation fish and the money paid for those fish.	* Federal enforcement personnel would track overage/donation fish and the money paid for those fish.			* Federal enforcement personnel and/or state enforcement personnel would share the tracking of overage/donation fish and the money paid for those fish.		

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes the Pacific Coast groundfish fishery and the resources that would be affected by the proposed action. Resources are discussed in the order they are affected by the proposed action. In other words, those resources that would be most affected by the proposed action are discussed first followed by those least affected by the proposed action. Socioeconomic resources are discussed in Chapter 3.2, biological resources are discussed in Chapter 3.3, and physical resources are discussed in Chapter 3.4.

3.2 Socioeconomic Characteristics of the Affected Resource

3.2.1 History of the Whiting Fishery

During the late 1970s and 1980s, the whiting fishery was conducted primarily by foreign fishing vessels and by joint venture partnerships between foreign and U.S. firms. Joint ventures were arrangements between U.S. catcher vessels and foreign companies during which the U.S. fishers would catch and deliver whiting to foreign processing vessels. Fishing operations during this period were low intensity compared to those of the 1990s and fishing typically lasted from April through September or October. In the late 1980s, at-sea processors introduced surimi technology into their operations and the fishery immediately changed to a fast-paced competition for the available quota. Surimi is a thick, paste-like or gel product made from washing and de-watering fish flesh that is further processed to create such products as artificial crab and shrimp. This accelerated whiting fishery continued in the early 1990s when U.S. firms preempted all foreign fishing and processing activities (NMFS 2002).

By 1991, surimi technology and market conditions for whiting were sufficiently developed to allow for large-scale production. This resulted in an influx of high capacity domestic catcher/processors and mothership processors which were capable of fully harvesting the whiting allocation. As these high volume domestic processors joined the fishery, the fishing pattern of the 1980s and early 1990s was replaced by a fast-paced fishery concentrated earlier in the season and further south along the coast (PFMC 1996). The pattern of fishing earlier in the year and further south changed in 1992 with the implementation of regulations designed to minimize the bycatch of salmon and rockfish in the whiting fishery.

Currently, the whiting fishery occurs primarily during April - November along the coasts of northern California, Oregon, and Washington. The fishery is conducted almost exclusively with midwater trawls. Most fishing activity occurs over bottom depths of 100 - 500 m, but offshore extensions of fishing activity have occurred. Whiting is a high volume species, but commands a relatively low price per pound. The whiting industry is composed of the tribal and non-tribal commercial fisheries each of which has their own allocations. The tribal allocation is determined on a sliding scale based on a percentage of the OY. The non-tribal commercial fishery is composed of the shore-based sector and the at-sea sector, the latter includes both the catcher/processor and mothership sectors. These sectors are not completely distinct. Separate allocations of the commercial OY have been effective since 1997 and they are 42 % to the shore-

based, 34 % to the catcher/processor, and 24 % to the mothership sectors.

3.2.2 Economic Profile of the Shore-based Pacific Whiting Industry

This section presents information describing the economic characteristics of the shore-based Pacific whiting industry. Information presented in this section describes vessels that are actively involved in the shore-based Pacific whiting fishery by analyzing vessels that made landings in excess of 200,000 pounds of Pacific whiting per year. Although full retention vessels are required to register for a Pacific whiting exempted fishing permit (EFP), 200,000 pounds is an approximate threshold between vessels that consistently participate within the fishery, and vessels that had received an EFP in some years, but did not actively engage in the fishery in most years. This section also examines processors that received landings of Pacific whiting from vessels making shore-based whiting trips.

Shore-based Whiting Vessels

Participation by catcher vessels in the Pacific whiting fishery has varied slightly over the past several years. Total shore-based vessel participation has ranged from thirty-five vessels in the late 1990's, to twenty-eight vessels in 2001 and 2002. Vessels participating in the shore-based whiting fishery also participate in other fisheries as well. Landings by shore-based whiting vessels are reported for every other fishery management group, though revenues from the shrimp, salmon, and highly migratory fisheries may be considered minor compared to revenues from the general groundfish and crab fisheries.

In Table 3.2.2.1 and Figure 3.2.2.2, data are presented showing historic participation and revenue by those vessels actively engaged in the shore-based whiting fishery. In Table 3.2.2.1, each column represents a West Coast fishery, and each sub-column represents the number of vessels and the amount of revenue generated by those vessels. Each row represents a year, and each sub-row represents a vessel length category. For example, under the Pacific whiting column, the first set of cells represents the year 1998. In 1998, there were 8 vessels in the whiting fishery under 70 feet in length and those vessels averaged over $130,000 in gross revenues from Pacific whiting landings.

Most vessels that participate in the shore-based whiting fishery also participate in the West Coast general groundfish fishery. Many vessels also recorded landings of coastal pelagic species and about one-third of the whiting vessels participate in the West Coast crab fisheries. In addition to West Coast fisheries, several whiting vessels also participate in the Alaska groundfish fisheries. Vessels participating in the shore-based Pacific whiting fishery generated ex-vessel revenues from West Coast fisheries ranging from $9.6 million to $13.2 million. Revenue from Pacific whiting has represented approximately 39% - 59% of total West Coast vessel revenues depending on the year. This total does not include revenue that may have been generated from Alaska fisheries.

Participation in the Pacific whiting fishery has declined slightly in past years. This decline has occurred as average gross revenues per vessel were also declining. Gross revenues declined from a high of nearly $230,000 per vessel in 2000 to near $160,000 per vessel in 2002 and 2003. Assuming that changes in gross revenues are an indicator of changes in net revenues, then the decline in participation by shore-based whiting vessels is likely due to declining net revenues.

Table 3.2.2.1. Landings and Revenue of Shore-Based Pacific Whiting Vessels by Year, Vessel Length, and Management Group.

		Pacific Whiting			Coastal Pelagic		Crab		Other Groundfish		Highly Migratory		Shrimp		Total Rev from All Fisheries
YEAR	Vessel Length	Vessel Count	Total Rev	Avg Rev	Vessel Count	Total Rev	Vessel Count	Total Rev	Vessel Count	Total Rev	Vessel Count	Total Rev	Vessel Count	Total Rev	Total Revenue
1998	< 70	8	1,050,783	131,348	7	26,876	1	D	8	970,360	3	509	2	D	2,382,373
	70 - 74	7	1,042,632	148,947	7	18,043	2	D	7	676,481	3	1,873	1	D	1,906,280
	75 - 79	9	1,312,207	145,801	9	14,963	3	191,498	9	1,449,012	3	207	3	29,038	3,007,880
	80 - 84	3	253,651	84,550	3	9,203	2	D	3	319,195	2	D			764,844
	85 - 89	3	458,857	152,952	3				3	87,997					546,876
	> 89	4	635,341	158,835	4	1,133	1	D	4	105,895					906,311
1998 Total		35	4,831,824	138,052	34		9	799,208	35	3,633,470	11	2,733	6	242,329	9,623,787
1999	< 70	8	1,210,907	151,363	8	3,356	3	353,829	8	1,030,001	3	136	3	66,264	2,676,940
	70 - 74	6	1,380,590	230,098	6	2,075	1	D	6	706,214	3	1,164	1	D	2,240,383
	75 - 79	9	1,436,511	159,612	9	5,579	1	D	9	1,450,688	3	1,235	2	D	3,097,851
	80 - 84	3	665,265	221,755	3	3,791	2	D	3	330,879					1,299,357
	85 - 89	3	1,079,032	359,677	3				3	100,694					1,179,725
	> 89	4	906,987	226,747	4	5	1	D	4	139,559			1	D	1,488,661
1999 Total		35	6,738,045	192,516	35	15,577	8	1,349,549	35	4,050,796	9	2,535	8	226,842	12,404,710
2000	< 70	7	805,955	115,136	6	953	3	414,417	7	1,092,693	2	D	1	D	2,396,254
	70 - 74	7	1,929,947	275,707	7	5,797	2		7	922,371	2	D			2,929,493
	75 - 79	9	1,382,466	153,607	9	3,051	3	121,351	9	1,422,875	2	D	1	D	2,948,951
	80 - 84	3	716,266	238,755	3	3,639	2	D	3	304,526	1	D	1	D	1,457,247
	85 - 89	3	1,371,849	457,283	3	3,363			3	98,938	2	D			1,478,120
	> 89	5	1,545,158	309,032	5	8,630	1	D	5	226,307	4	4	1	D	1,869,282
2000 Total		35	7,875,398	225,011	34		11	1,085,715	35	4,109,681	13	1,328	4	107,539	13,245,728
2001	< 70	4	575,214	143,804	4	18,380	3	286,367	4	822,661	2	D	3	32,128	1,737,157
	70 - 74	8	1,591,876	198,984	8	26,220	3	272,021	8	665,411	3	2,635	1	D	2,569,249
	75 - 79	7	1,196,047	170,864	7	28,174	2	D	7	707,686	1	D	2	D	2,127,624
	80 - 84	3	634,925	211,642	3	34,387	2	D	3	235,107	1	D			1,044,861
	85 - 89	3	795,186	265,062	3	40,551			3	37,646					884,358
	> 89	2	D	D	2	D	1	D	2	D					D
2001 Total		28	5,661,501	202,196	28	172,263	11	1,001,382	28	2,647,764	7	2,747	6	125,477	9,695,048
2002	< 70	4	406,951	101,738	4	76	4	407,130	4	505,821			3	172,494	1,492,758
	70 - 74	8	1,237,609	154,701	7	945	2	D	8	507,348	3	69	2	D	2,127,917
	75 - 79	6	857,938	142,990	6	614	1	D	6	646,642	3	1,375	1	D	1,678,832
	80 - 84	4	756,234	189,059	4	108	2	D	4	421,834					1,572,938
	85 - 89	3	651,787	217,262	3	437			3	69,954					722,782
	> 89	2	D	D	2	D	2	D	2	D			1	D	D
2002 Total		28	4,498,592	160,664	27	2,232	11	1,235,452	28	2,243,434	6	1,444	7	384,761	8,377,776
2003	< 70	5	464,787	92,957	4	955	4	1,227,130	5	697,499	1	D	2	D	2,612,864
	70 - 74	7	1,326,887	189,555	7	12,000	2	D	7	454,279	4	2,999	1	D	2,432,072
	75 - 79	8	1,027,953	128,494	8	2,876	2	D	9	1,015,477	4	2,608	1	D	2,768,703
	80 - 84	3	582,553	194,184	3	1,274	2	D	3	236,531	1	D			1,614,819
	85 - 89	3	656,602	218,867	3	1,624			3	6,631	1	D			665,429
	> 89	2	D	D	2	D	1	D	2	D	1	D			D
2003 Total		30	4,846,455	161,549	29	20,465	12	4,115,521	31	2,748,744	14	32,108	5	396,478	12,174,589

Source: PacFIN 2004. Note: D denotes data is restricted due to confidentiality

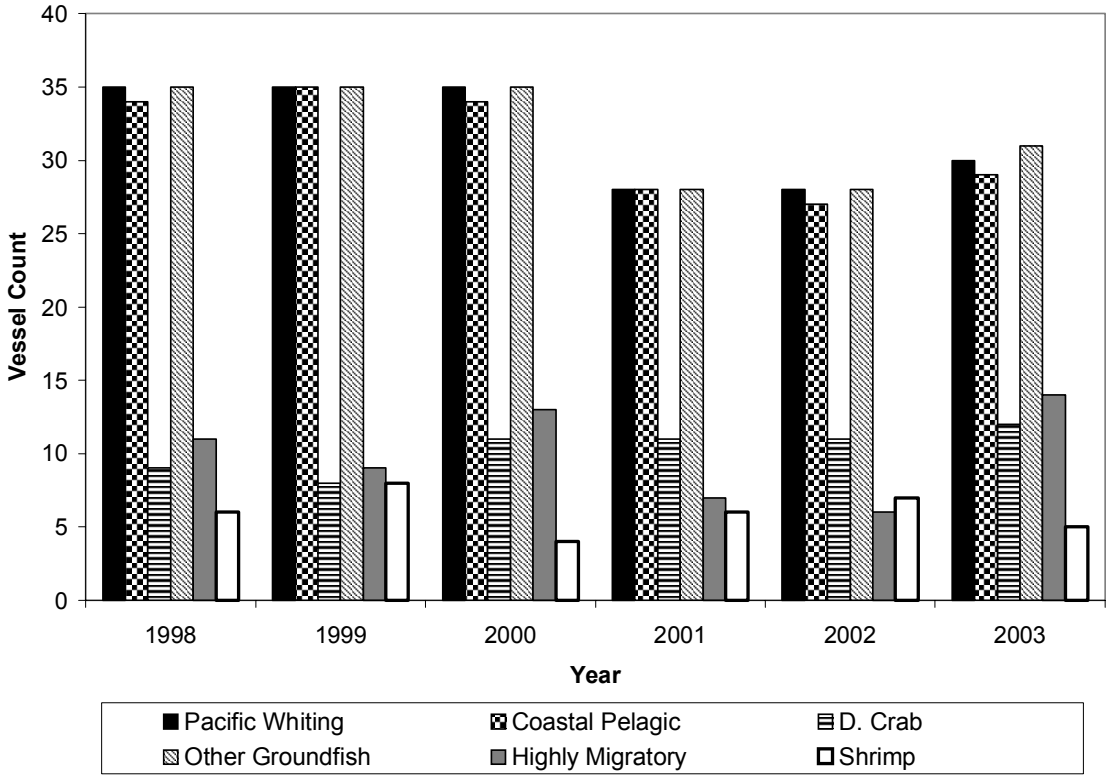

Figure 3.2.2.2. Count of Shore-Based Pacific Whiting Vessels by Year and Management Group. Source: PacFIN 2004

Shore-based Whiting Processors and Regions

This section presents information on processors, communities, and states where Pacific whiting is landed. Table 3.2.2.3 shows an overview of landings and the associated vessel revenue for Pacific whiting during 1998 to 2003. Information on revenues generated by processors does not exist at this time.

Table 3.2.2.3 Average Annual Landed Pounds and Revenue per State (1998 - 2003)

State	Avg Annual Landed Weight (lbs)	Avg Annual Landed Revenue	Number of Unique Buyers (1998 - 2003)
Oregon	122,658,576	$6,736,042	12
California	5,966,015	$364,134	3
Washington	24,210,466	$1,283,698	3
Total	152,835,058	8,383,874	18

As shown in Table 3.2.2.3, the highest percentage of Pacific whiting landings occur in Oregon, followed by Washington, and then California. Due to confidentiality, data identifying landings by community cannot be presented. However, communities receiving landings of Pacific whiting have historically included Westport and Ilwaco, Washington; Astoria, Newport, and Coos Bay, Oregon; and Eureka, Crescent City, and Fields Landing, California. Of these communities, Newport, Astoria, and Westport are typically highest in overall landed volume of Pacific whiting and the associated revenue.

Table 3.2.2.4 Shore-Side Whiting Purchasing Activity by State and Buyer

State	AD-HOC BUYER ID	1998	1999	2000	2001	2002	2003
California	A	YES	NO	YES	NO	YES	YES
	B	NO	NO	YES	NO	NO	NO
	C	YES	YES	YES	YES	NO	NO
Oregon	D	NO	YES	NO	NO	NO	NO
	E	YES	YES	YES	YES	YES	YES
	F	YES	YES	YES	YES	YES	YES
	G	YES	YES	NO	NO	NO	NO
	H	YES	NO	YES	YES	YES	YES
	I	YES	YES	YES	YES	YES	YES
	J	YES	YES	YES	NO	NO	NO
	K	NO	YES	NO	YES	YES	YES
	L	NO	YES	YES	YES	YES	YES
Washington	M	YES	YES	YES	YES	NO	YES
	N	YES	YES	YES	YES	YES	YES
	O	YES	NO	NO	NO	NO	NO
	P	NO	YES	YES	NO	NO	NO
	Q	YES	NO	YES	NO	NO	NO
	R	YES	YES	NO	NO	NO	NO
	S	YES	YES	NO	NO	NO	NO
	T	NO	NO	YES	NO	NO	NO
	U	NO	NO	YES	NO	NO	NO
	V	YES	NO	NO	NO	NO	NO

source: PacFIN database. 2004. Fish Ticket and Fish Ticket Line Table
note: YES indicates that buyer actively purchased whiting during directed shore-based whiting activity

Substantial processor consolidation has been occurring along the Pacific coast. This has coincided with declines in the landed catch of more traditional and valuable groundfish species. Although processors typically diversify their operations to maximize profit and hedge against market and species stock fluctuation, recent declines in landed catch value have likely caused processors to close their operations, or to consolidate with other operations.

Data is available to show the number of buyers purchasing Pacific whiting, but not actual processors. Landed pounds per processor are not available because records only specify the buyer of the landed catch. Buyers may be the same as processors, but they may also differ from processors. For example, catch that is landed in smaller ports will often be trucked to another port or city for processing.

Table 3.2.2.4 shows buyers by state where a vessel made landings of Pacific whiting and Pacific whiting was the The number of buyers purchasing Pacific whiting has decreased in recent years. In 1998, there were 11 buyers of Pacific whiting, and in 2002 and 2003 there were 7 buyers. In 1998, 8 buyers were registered in Oregon as receiving landings of Pacific whiting, while in 2003, there were 5 buyers. Washington has consistently had 2 buyers in any given year. California had no unique buyers recorded in 2003, but have historically had 1 to 2 buyers per year.

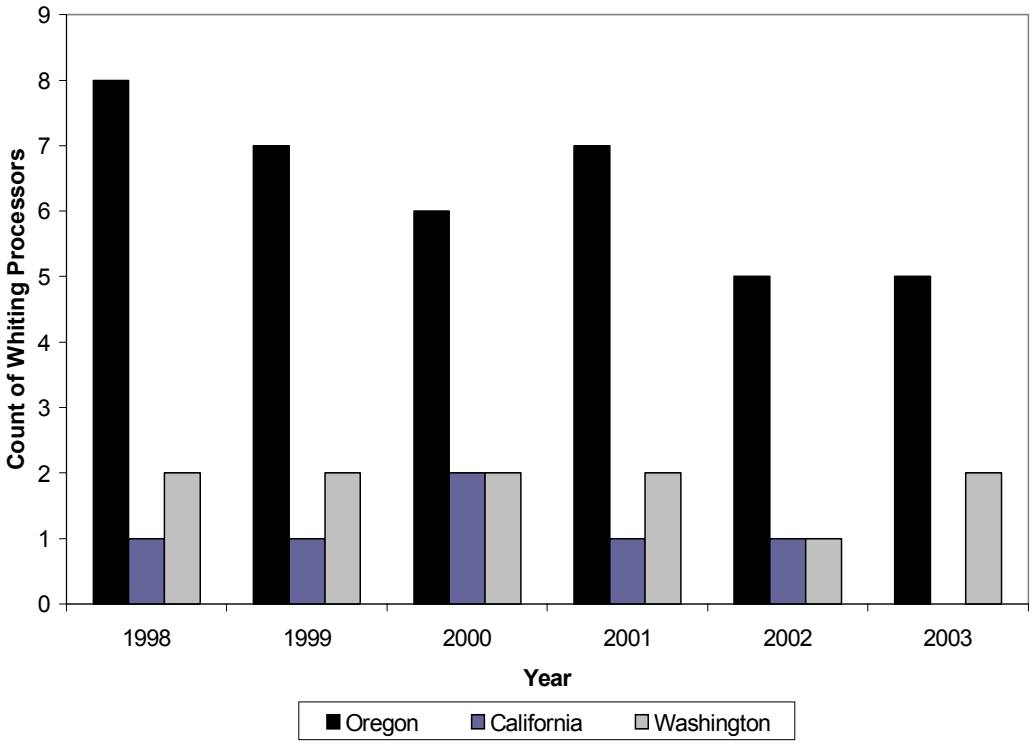

Figure 3.2.2.5. Count of Pacific Whiting Buyers by State 1998 - 2003. Source: PacFIN 2004.

3.2.3 Counties Affected by the Shore-based Whiting Fishery

Counties and communities that are actively involved in the shore-based Pacific whiting industry tend to have economies that are based on tourism, natural resources, and government. Unfortunately, data describing the economic characteristics at the community level are not disclosed by economic and demographic data reporting agencies, but data describing counties can be used as a proxy for describing the composition of major communities within that county.

Table 3.2.3.1 shows wage and salary disbursements by county and major industry in 2001 reported by the U.S. Bureau of Economic Analysis. Wage and salary disbursements are generally a measure of income generated by individuals that are not self employed. Individuals that are employed within the fishing industry will, for the most part, not be counted in these data since fishing employment is typically characterized by self-employed individuals. Estimates of

individuals employed in the fishing industry are shown later.

Table 3.2.3.1 Wage and Salary Disbursements by Industry and County in 2001 (thousands of $)

Industry	Clatsop	Lincoln	Grays Harbor	Del Norte	Coos	Pacific	Humboldt
Forestry, fishing, and other	20,176	(D)	(D)	(D)	46,032	17,060	(D)
Mining	(L)	(D)	(D)	(D)	1,675	1,286	(D)
Utilities	3,335	2,943	(D)	(D)	3,469	(D)	(D)
Construction	39,200	39,073	54,234	10,588	35,564	7,405	113,920
Manufacturing	103,444	53,412	147,578	11,138	64,837	21,245	176,327
Wholesale trade	6,638	7,289	(D)	(D)	15,238	930	(D)
Retail trade	53,629	64,231	81,806	22,007	70,376	16,111	198,222
Transportation and warehousing	14,663	6,550	25,967	4,931	35,550	(D)	(D)
Information	8,503	9,910	6,494	2,865	15,035	1,189	28,540
Finance and insurance	9,956	10,270	24,794	2,591	20,683	5,984	66,992
Real estate and rental and leasing	6,114	8,570	8,920	2,629	7,260	1,348	26,653
Professional and technical services	(D)	21,820	35,199	6,417	26,141	4,545	87,891
Management of companies and enterprises	(D)	1,857	2,299	(D)	7,068	766	21,606
Administrative and waste services	7,267	16,717	7,958	(D)	22,408	3,211	48,008
Educational services	1,237	901	845	298	1,735	(L)	5,499
Health care and social assistance	56,988	39,774	74,215	33,721	67,599	11,339	220,523
Arts, entertainment, and recreation	7,079	6,412	4,754	1,233	3,441	2,187	11,037
Accommodation and food services	60,148	75,546	42,797	15,536	35,967	12,718	90,167
Other services, except public administration	16,320	18,368	32,358	7,445	24,506	8,455	79,895
Government and government enterprises	116,902	161,157	230,801	129,656	231,617	68,991	485,166

source: Bureau of Economic Analysis 2004. Note: (D) means data is restricted due to confidentiality

The data in Table 3.2.3.1 shows that the largest industries reported by the Bureau of Economic Analysis in counties associated with the shore-based Pacific whiting industry are generally *Forestry, Fishing, and other*, *Manufacturing*, *Government and government enterprise*, *Health Care and social Assistance*, *Accommodation and Food Services,* and *Retail Trade*. Industries falling within the *Forestry, Fishing, and other*, and *Manufacturing* sectors are largely made up of timber and fishing industry related business, and timber and seafood processing. *Accommodation and Food Services,* and *Retail Trade* are largely made up of businesses reliant on the tourism sector.

Table 3.2.3.2 shows data estimating employment and receipts in the fishing industry for businesses without paid employees. The U.S Census defines the fishing sector as an industry comprised of establishments primarily engaged in the commercial catching or taking of finfish, shellfish, or miscellaneous marine products from a natural habitat, such as the catching of bluefish, eels, salmon, tuna, clams, crabs, lobsters, mussels, oysters, shrimp, frogs, sea urchins,

and turtles. Since most individuals employed in fish harvesting are self employed (including skippers and crewmembers), this table represents an approximation of the number of people employed in fishing, and the amount of income generated by those individuals.

Table 3.2.3.2 Fishing-Related Self-Emploment and Income by County in 2001

County	Establishments	Receipts (Thousands $)
Clatsop	280	15,023
Lincoln	286	21,928
Grays Harbor	297	15,971
Del Norte	131	3,736
Coos	166	9,199
Pacific	243	11,363
Humboldt	194	6,375

source: U.S. Census Bureau, 2004

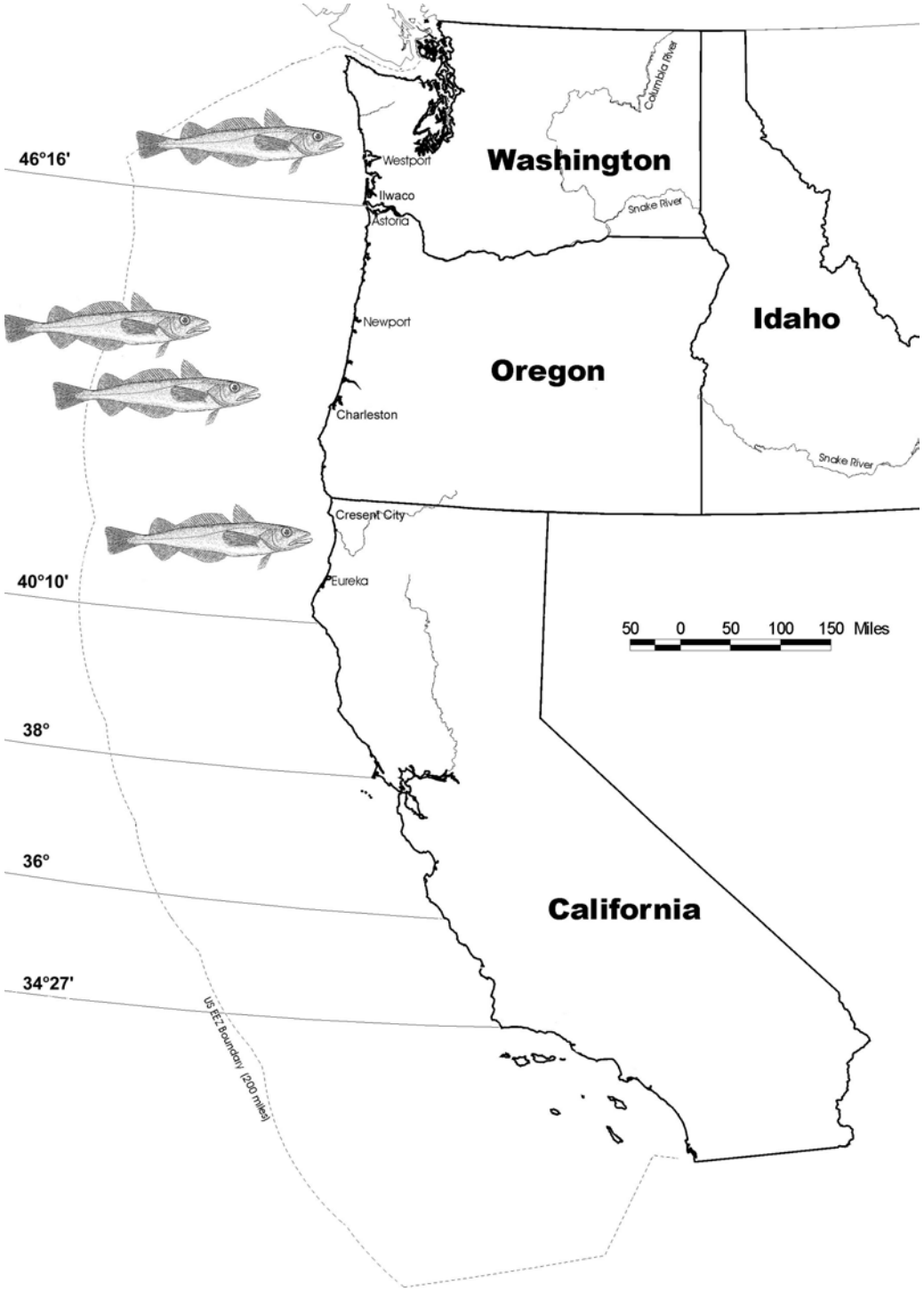

Figure 3.2.3.3. Map of the Pacific Coast showing important ports for the processing of whiting taken by the shore-based whiting fishery.

3.2.4 Shoreside Observer Program

The Shoreside Whiting Observation Program (SWOP) was established in 1992 to provide information for evaluating incidental catch in the shore-based whiting fishery and conservation measures adopted to protect salmon and other prohibited species. The program is a cooperative effort between the fishing industry and state and Federal management agencies conducted on an annual basis to account for total catch and to accommodate the landing of non-sorted catch in the shore-based whiting fishery. Participating vessels apply for and carry EFPs, issued by NMFS, that allow them to land unsorted catch at designated processing plants. Additionally, the EFPs allow vessels to land prohibited species (i.e., Pacific salmon, Pacific halibut, Dungeness crab) and groundfish in excess of trip limits without penalty, provided catch is forfeited to the state. Participants in the SWOP include: catcher vessels carrying EFPs, designated processing plants along the Pacific Coast, PFMC, NMFS, Pacific States Marine Fisheries Commission (PSMFC), ODFW, California Department of Fish and Game (CDFG), and Washington Department of Fish and Wildlife (Wiedoff and Parker 2002).

Over time, the goals of the SWOP and associated sampling methodologies have changed in response to the data needs and funding of state and Federal fishery management agencies. During the first few years of the program, SWOP's goals were a high target rate of observation (50% of the landings) and a focus on prohibited species. In 1995, the SWOP changed its emphasis to a lower rate of observation (10% of the landings) and an increased collection of biological information (length, weight, age, maturity) from whiting and selected bycatch species (yellowtail rockfish, widow rockfish, sablefish, Pacific mackerel, jack mackerel, and prohibited species)(Weeks and Hutton 1998). The required observation rate was decreased as studies indicated that fish tickets were a good representation of the species composition of landed catch. In 1997, sampling protocols changed again in response to an increased bycatch rates of yelloweye and yellowtail rockfish. Since then, the landings of yellowtail and widow rockfish in the shore-based fishery have dramatically decreased because of fishers' increased awareness of bycatch and allocation issues in the shore-based whiting fishery. In 2002, there was some concern about sablefish bycatch in the shore-based whiting fishery because of increased numbers of juvenile sablefish found along the Pacific Coast (Wiedoff and Parker 2002).

Much like the program's goals, the costs associating with operating the SWOP have also changed since the program began in 1992. The cost was approximately $60,000 (approximately $30,000 for coordination/data processing costs and approximately $30,000 for observers) in 1996 (Weeks and Hutton 1997) as compared to approximately $82,508 (approximately $46,738 for coordination/data processing costs and an estimated $35,770 for observers) in 2001 (Parker 2001). Because of a shorter season in 2003, the cost was approximately $70,327 (approximately $40,519 for coordination/data processing coast and an estimated $29,808 for observers) (Wiedoff et al. 2003). Government costs, which are not included in the above estimates, have also changed over time. These government costs cover state agencies providing sampling personnel, infrastructure, data summary and analysis during winter months, data tracking, and Pacific Council support on bycatch issues.. In the past, these costs were relatively minor. However, these costs have become increasingly substantial over time, as management agencies have increased their focus on bycatch issues, and now require months of staff time and cost more than $20,000. In 2003, Oregon processing plants hired six observers to make observations at five

processing plants while WDFW and CDFG provided minimal landings coverage at the plants using existing staff. Additionally, nine processing plants contributed to the cost of the SWOP in 2003 (Wiedoff et al. 2003).

Salmon

Endangered
Chinook salmon (*Oncorhynchus tshawytscha)*
Sacramento River Winter; Upper Columbia Spring

Sockeye salmon (*Oncorhynchus nerka)*
Snake River

Steelhead trout (*Oncorhynchus mykiss)*
Southern California; Upper Columbia River

Threatened
Coho salmon (*Oncorhynchus kisutch)*
Central California; Southern Oregon, and Northern California Coasts

Chinook salmon (*Oncorhynchus tshawytscha*)
Snake River Fall, Spring, and Summer; Puget Sound; Lower Columbia; Upper Willamette; Central Valley Spring; California Coastal

Chum salmon (*Oncorhynchus keta)*
Hood Canal Summer; Columbia River

Sockeye salmon (*Oncorhynchus nerka)*
Ozette Lake

Steelhead trout (*Oncorhynchus mykiss)*
South-Central California; Central California Coast; Snake River Basin; Lower Columbia; California Central Valley; Upper Willamette; Middle Columbia River; Northern California

3.3 Biological Characteristics of the Affected Resource

3.3.1 Salmon Resources

As discussed in Chapter 1, the first objective for the proposed action is to track and collect morphological information from those salmon species incidentally taken in the shore-based whiting fishery. Several species of salmon found along the Pacific Coast have been listed under the Endangered Species Act (ESA) and data from the SWOP indicate that some of these species are incidentally taken in the shore-based whiting fishery.

Review of SWOP data in Table 3.3.1.1 indicates that the sockeye, chum, and pink salmon are rarely encountered in the shore-based whiting fishery. Coho is caught in relatively low numbers and chinook is the most common salmonid encountered in the shore-based whiting fishery.

Because several chinook salmon runs are listed under the ESA, the incidental catch of chinook salmon in the shore-based whiting fishery is a concern. The 1999 Biological Opinion analyzing the effects of the groundfish fishery on Pacific Coast salmon specifies a threshold for the incidental take of 0.05 mt chinook for all the sectors of the whiting fishery (at-sea, tribal, and shore-based) (NMFS 1999).

Chinook salmon is the largest-sized Pacific salmon with a distribution ranging from the Ventura River in California to Point Hope, Alaska in North America, and in northeastern Asia from Hokkaido, Japan to the Anadyr River in Russia (Healey 1991). Additionally, chinook salmon have been reported in the Mackenzie River area of northern Canada (McPhail and Lindsey 1970). Of the Pacific salmon, chinook salmon exhibit arguably the most diverse and complex

life history strategies. Healey (1986) described 16 age categories for chinook salmon, 7 total ages with 3 possible freshwater ages. This level of complexity is roughly comparable to sockeye salmon, although sockeye salmon have a more extended freshwater residence period and use different freshwater habitats (Miller and Brannon 1982; Burgner 1991). Two generalized freshwater life-history types were initially described by Gilbert (1912): "stream-type" chinook salmon reside in freshwater for a year or more following emergence, whereas "ocean-type"chinook salmon migrate to the ocean within their first year. Healey (1983; 1991) has promoted the use of broader definitions for "ocean-type" and "stream-type" to describe two distinct races of chinook salmon. This racial approach incorporates life history traits, geographic distribution, and genetic differentiation and provides a valuable frame of reference for comparisons of chinook salmon populations.

The generalized life history of Pacific salmon involves incubation, hatching, and emergence in freshwater, migration to the ocean, and subsequent initiation of maturation and return to freshwater for completion of maturation and spawning. Juvenile rearing in freshwater can be minimal or extended. Additionally, some male chinook salmon mature in freshwater, thereby foregoing emigration to the ocean. The timing and duration of each of these stages is related to genetic and environmental determinants and their interactions. Salmon exhibit a high degree of variability in life-history traits; however, there is considerable debate as to what degree this variability is the result of local adaptation or the general plasticity of the salmonid genome (Ricker 1972; Healey 1991; Taylor 1991).

In 2000, the incidental take of chinook salmon in the shore-based whiting fishery was almost double that of past years. The incidental take of chinook salmon in the other sectors of the whiting fishery was also high and resulted in a combined bycatch rate of 0.057. This incidental take exceeded the chinook threshold for the whiting fishery and led to a re-evaluation of the biological opinion that sets the allowable chinook salmon threshold. Discussions with fishers did not reveal any change in fishing behavior that would have accounted for the increased chinook catch. One possible explanation for the increased catch was that there were simply more chinook available to the whiting fishery than in past years (Hutton and Parker 2000).

Table 3.3.1.1. Salmon incidentally taken in the shore-based whiting fishery during 1991 - 2003.											
Year	**Whiting (mt)**	**Number of Chinook**	**Rate of Chinook (#/mt of whiting)**	**Number of Coho**	**Rate of Coho (#/mt of whiting)**	**Number of Pink**	**Rate of Pink (#/mt of whiting)**	**Number of Chum**	**Number of Sockeye**	**Total Number of Salmon**	**Total Rate of Salmon**
1991	20,359	41	0.002							41	0.002
1992	49,092	491	0.010							491	0.010
1993	41,926	419	0.010							419	0.010
1994	72,367	581	0.008	4		0		0	0	585	0.008
1995	73,397	2,954	0.040	2		15		1	0	2,972	0.040
1996	84,680	651	0.008	0		0		0	0	651	0.008
1997	87,499	1,482	0.017	2		0		0	0	1,484	0.017
1998	87,627	1,699	0.019	8		0		5	1	1,713	0.020
1999	83,388	1,696	0.020	5		11		0	0	1,712	0.021
2000	85,653	3,321	0.039	23		0		1	0	3,345	0.039
2001	73,326	2,634	0.036	35		304	0.004	32	0	3,005	0.041
2002	45,276	1,062	0.023	14		0		72	0	1,148	0.025
2003	50,964	425	0.008	0		0		0	0	425	0.008
Data are complied from an ODFW report “Salmon Bycatch in the Pacific Whiting Fisheries” (Weeks and Kaiser 1997) and unpublished ODFW data (B. Wiedoff, Marine Resources Program, ODFW, 2003, personal communication).											

3.3.2 Groundfish Resources

The Pacific Coast groundfish FMP manages over 80 species, many of which are caught in multi-species fisheries. These species, which include an array of flatfish, rockfish, and roundfish, occur throughout the EEZ and occupy diverse habitats during all stages of life history. Information on the interactions between groundfish species and between groundfish and non-groundfish species varies in completeness. While a few species have been intensely studied, there is relatively little information on most groundfish species and many groundfish species have never been comprehensively assessed.

Each fishing year, NMFS and the states assesses the biological condition of the Pacific Coast groundfish stocks and the Pacific Council develops recommendations for the allowable biological catch (ABC) for major groundfish stocks. Species and species groups with ABCs in 2003 include: lingcod, Pacific whiting, sablefish, POP, shortbelly rockfish, shortspine thornyhead, longspine thornyhead, widow rockfish, chilipepper rockfish, splitnose rockfish, cowcod, darkblotched rockfish, yellowtail rockfish, bocaccio, canary rockfish, yelloweye rockfish, Dover sole, and the minor rockfish complexes (northern and southern for nearshore, continental shelf, and continental slope species). The following eight groundfish stocks have been designated as "overfished" (less than 25% of its B_{MSY}): POP, bocaccio, lingcod, canary rockfish, cowcod, darkblotched rockfish, widow rockfish, and yelloweye rockfish.

Pacific Whiting

The shore-based fleet targets Pacific whiting (*Merluccius productus*), also known as Pacific hake, a semi-pelagic merlucciid (a cod-like fish species) that range from Sanak Island in the western Gulf of Alaska to Magdalena Bay, Baja California Sur. They are most abundant in the California Current System (Bailey 1982; Hart 1973; Love 1991; NOAA 1990). Smaller populations of Pacific whiting occur in several of the larger semi-enclosed inlets of the northeast Pacific Ocean, including the Strait of Georgia, Puget Sound, and the Gulf of California (Bailey et al. 1982; Stauffer 1985). The highest densities of Pacific hake are usually between 50 and 500 m, but adults occur as deep as 920 m and as far offshore as 400 km (Bailey 1982; Bailey et al. 1982; Dark and Wilkins 1994; Dorn 1995; Hart 1973; NOAA 1990; Stauffer 1985). Hake school at depth during the day, then move to the surface and disband at night for feeding (McFarlane and Beamish 1986; Sumida and Moser 1984; Tanasich et al. 1991). Coastal stocks spawn off Baja California in the winter, then the mature adults begin moving northward and inshore, following the food supply and Davidson currents (NOAA 1990). Hake reach as far north as southern British Columbia by fall. They then begin the southern migration to spawning grounds and further offshore (Bailey et al. 1982; Dorn 1995; Smith 1995; Stauffer 1985).

Spawning occurs from December through March, peaking in late January (Smith 1995). Pacific hake are oviparous with external fertilization. Eggs of the Pacific hake are neritic and float to neutral buoyancy (Bailey et al. 1982; NOAA 1990). Hatching occurs in 5 - 6 days and within 3 - 4 months juveniles are typically 35 mm (Hollowed 1992). Juveniles move to deeper water as they get older (NOAA 1990). Females often mature at 3 - 4 years (34 - 40 cm,) and nearly all males are mature by 3 years (28 cm). Females grow more rapidly than males after four years; growth ceases for both sexes at 10 - 13 years (Bailey et al. 1982).

Mathematical models incorporating a variety of survey and observer data to assess stock size, harvest levels, and recruitment are used to estimate a single ABC for the entire U.S./Canadian coastal stock. The whiting stock biomass increased to a historical high of 5.8 million metric tons (mt) in 1987 due to exceptionally large 1980 and 1984 year classes, then declined as these year classes passed through the population and were replaced by more moderate year classes. The stock size stabilized briefly between 1995-1997, but has declined continuously over the past several years to its lowest point in 2001.

The 2002 stock assessment estimated that the biomass in 2001 was 0.7 million mt, and that the female spawning biomass was less than 20 % of the unfished biomass. Because the overfished threshold under the FMP is 25 % of the unfished biomass, the whiting stock was designated overfished in 2001. The female spawning biomass was estimated to increase over the next 3 years due to the incoming 1999 year-class, but the increase would be dependent upon the magnitude of that cohort as well as the exploitation rate (NMFS 2002).

A new 2003 whiting stock assessment estimated that the abundance of whiting has increased substantially since the last assessment based largely on the abundance of the 1999 year class. However, the pattern of stock growth is very similar to what has been estimated in past assessments. The stock was estimated to be 47 % of its unfished biomass in 2003 (2.7 million mt of age 3+ fish) when a survey catchability coefficient of 1.0 was applied and at 51 % (4.2 million mt of age 3+ fish) of its unfished biomass in 2003 when a survey catchability coefficient of 0.6 was applied. Under both scenarios, the whiting biomass in 2003 is estimated to be above the target rebuilding biomass and is no longer consider to be overfished. However, in the absence of a large year class after 1999, the stock is projected to decline again.

Incidental take in the Shore-based Whiting Fishery

Pacific whiting undertake a diurnal vertical migration and tend to form extensive midwater aggregations during the day. These dense schools occur between the depths of 100 and 250 meters (Stauffer 1985). Because whiting disperse throughout the water column at dusk and remain near the surface at night, fishing has traditionally occurred during daylight hours. The results of fishing on concentrated midwater schools results in almost pure catches, with incidental catch typically amounting to less than 3 % of the total catch by weight. Species that are incidentally taken in the whiting fishery may be commingled with whiting or merely in the vicinity of whiting schools, depending on the relationships between the various species. Major factors affecting bycatch are area, depth, season, time of day, environmental conditions, and species abundance (NMFS 2002).

One objective of the proposed action is to track the incidental catch of overfished groundfish species in the shore-based whiting fishery. In 2002, this fishery had incidental catches of widow rockfish, canary rockfish, lingcod, Pacific ocean perch (POP), bocaccio, and darkblotched rockfish. While this fishery has relatively low takes of non-whiting groundfish species, the most common groundfish species, by weight, incidentally taken in the 2003 shore-based whiting are yellowtail rockfish, sablefish, and widow rockfish. Table 3.3.2.1 shows the 2003 incidental take of overfished groundfish species as well as those groundfish species most commonly taken in the shore-based fishery during 2003.

Table 3.3.2.1. Catch of prohibited species and groundfish in the 2003 EFP shore-based whiting fishery.			
Species	**Catch (mt)**	**Species**	**Catch (mt)**
Pacific halibut	16 (# of fish)	POP	0.30
Dungeness crab	2 (# of crab)	Darkblotched	0.26
Yellowtail	48.70	Bocaccio	0
Widow	8.97	Lingcod	0.40
Sablefish	41.54	Misc. Rockfish	10.03
Canary	0.11	Yelloweye	0.11
Data were taken from an ODFW report "Shoreside Hake Observation Program: 2003" (Wiedoff et al. 2003) available on the web at http://hmsc.oregonstate.edu/odfw/finfish/wh/index.html.			

Widow Rockfish

Widow rockfish (*Sebastes entomelas*) range from Albatross Bank off Kodiak Island to Todos Santos Bay, Baja California (Eschmeyer et al. 1983; Miller and Lea 1972; NOAA 1990). Widow rockfish occur over hard bottoms along the continental shelf (NOAA 1990). Widow rockfish prefer rocky banks, seamounts, ridges near canyons, headlands, and muddy bottoms near rocks. Large widow rockfish concentrations occur off headlands such as Cape Blanco, Cape Mendocino, Point Reyes, and Point Sur. Adults form dense, irregular, midwater and semi-demersal schools deeper than 100 m at night and disperse during the day (Eschmeyer et al. 1983; NOAA 1990; Wilkins 1986). All life stages are pelagic, but older juveniles and adults are often associated with the bottom (NOAA 1990). All life stages are fairly common from Washington to California (NOAA 1990). Pelagic larvae and juveniles co-occur with yellowtail rockfish, chilipepper, shortbelly rockfish, and bocaccio larvae and juveniles off central California (Reilly et al. 1992).

Widow rockfish are viviparous, have internal fertilization, and brood their eggs until released as larvae (NOAA 1990; Ralston et al. 1996; Reilly et al. 1992). Mating occurs from late fall to early winter. Larval release occurs from December - February off California, and from February - March off Oregon. Juveniles are 21-31 mm at metamorphosis, and they grow to 25-26 cm over 3 years. Age and size at sexual maturity varies by region and sex; size generally increases with age, for females, and the further north the fish are found. Some widow rockfish mature in 3 years (25-26 cm), 50% are mature by 4-5 years (25-35 cm), and most are mature in 8 years (39-40 cm) (NOAA 1990). The maximum age of widow rockfish is 28 years, but rarely over 20 years for females and 15 years for males (NOAA 1990). The largest size is 53 cm, about 2.1 kg (Eschmeyer et al. 1983; NOAA 1990).

Widow rockfish are carnivorous, with adults feeding on small pelagic crustaceans, midwater fishes (such as age-1 or younger Pacific hake), salps, caridean shrimp, and small squids (Adams 1987; NOAA 1990). During spring, the most important prey item is salps, during the fall fish are more important, and during the winter widow rockfish primarily eat sergestid shrimp (Adams 1987). Feeding is most intense in the spring after spawning (NOAA 1990). Pelagic juveniles are opportunistic feeders and their prey consists of various life stages of calanoid copepods, and euphausiids (Reilly et al. 1992).

Canary Rockfish

Canary Rockfish (*Sebastes pinniger*) are found between Cape Colnett, Baja California, and southeastern Alaska (Boehlert 1980; Boehlert and Kappenman 1980; Hart 1973; Love 1991; Miller and Lea 1972; Richardson and Laroche 1979). There is a major population concentration of canary rockfish off Oregon (Richardson and Laroche 1979). Canary primarily inhabit waters 91 - 183 m deep (Boehlert and Kappenman 1980). In general, canary rockfish inhabit shallow water when they are young and deep water as adults (Mason 1995). Adult canary rockfish are associated with pinnacles and sharp drop-offs (Love 1991). Canary rockfish are most abundant above hard bottoms (Boehlert and Kappenman 1980). In the southern part of its range, the canary rockfish appears to be a reef-associated species (Boehlert 1980). In central California, newly settled canary rockfish are first observed at the seaward, sand-rock interface and farther seaward in deeper water (18 - 24 m).

Canary rockfish are ovoviviparous and have internal fertilization (Boehlert and Kappenman 1980; Richardson and Laroche 1979). Off California, canary rockfish spawn from November - March and from January - March off Oregon and Washington (Hart 1973; Love 1991; Richardson and Laroche 1979). The age of 50% maturity of canary rockfish is 9 years; nearly all are mature by age 13. The maximum length canary rockfish grow to is 76 cm (Boehlert and Kappenman 1980; Hart 1973; Love 1991). Canary rockfish primarily prey on planktonic creatures, such as krill, and occasionally on fish (Love 1991). Canary rockfish feeding increases during the spring-summer upwelling period when euphausiids are their dominant prey (Boehlert et al. 1989).

Lingcod

Lingcod (*Ophiodon elongatus*), a top order predator of the family Hexagrammidae, ranges from Baja California to Kodiak Island in the Gulf of Alaska. Lingcod is demersal at all life stages (Allen and Smith 1988; NOAA 1990; Shaw and Hassler 1989). Adult lingcod prefer two main habitat types: slopes of submerged banks 10 - 70 m below the surface with seaweed, kelp and eelgrass beds and channels with swift currents that flow around rocky reefs (Emmett et al. 1991; Giorgi and Congleton 1984; NOAA 1990; Shaw and Hassler 1989). Juveniles prefer sandy substrates in estuaries and shallow subtidal zones (Emmett et al. 1991; Forrester 1969; Hart 1973; NOAA 1990; Shaw and Hassler 1989). As the juveniles grow they move to deeper waters. Adult lingcod are considered a relatively sedentary species, but there are reports of migrations of greater than 100 km by sexually immature fish (Jagielo 1990; Mathews and LaRiviere 1987; Mathews 1992; Smith et al. 1990).

Mature females live in deeper water than males and move from deep water to shallow water in the winter to spawn (Forrester 1969; Hart 1973; Jagielo 1990; LaRiviere et al. 1980; Mathews and LaRiviere 1987; Mathews 1992; Smith et al. 1990). Mature males may live their whole lives associated with a single rock reef, possibly out of fidelity to a prime spawning or feeding area (Allen and Smith 1988; Shaw and Hassler 1989). Spawning generally occurs over rocky reefs in areas of swift current (Adams 1986; Adams and Hardwick 1992; Giorgi 1981; Giorgi and Congleton 1984; LaRiviere et al. 1980). After the females leave the spawning grounds, the males remain in nearshore areas to guard the nests until the eggs hatch. Hatching occurs in April off Washington but as early as January and as late as June at the geographic extremes of the lingcod range. Males begin maturing at about 2 years (50 cm), whereas females mature at 3+ years (76 cm). In the northern extent of their range, fish mature at an older age and larger size (Emmett et al. 1991; Hart 1973; Mathews and LaRiviere 1987; Miller and Geibel 1973; Shaw and Hassler 1989). The maximum age for lingcod is about 20 years (Adams and Hardwick 1992).

Lingcod are a visual predator, feeding primarily by day. Larvae are zooplanktivores (NOAA 1990). Small demersal juveniles prey upon copepods, shrimps and other small crustaceans. Larger juveniles shift to clupeids and other small fishes (Emmett et al. 1991; NOAA 1990). Adults feed primarily on demersal fishes (including smaller lingcod), squids, octopi and crabs (Hart 1973; Miller and Geibel 1973; Shaw and Hassler 1989). Lingcod eggs are eaten by gastropods, crabs, echinoderms, spiny dogfish, and cabezon. Juveniles and adults are eaten by marine mammals, sharks, and larger lingcod (Miller and Geibel 1973; NOAA 1990).

Pacific Ocean Perch

Pacific ocean perch (*Sebastes alutus*) are found from La Jolla (southern California) to the western boundary of the Aleutian Archipelago (Eschmeyer et al 1983; Gunderson 1971; Ito 1986; Miller and Lea 1972), but are common from Oregon northward (Eschmeyer et al. 1983). Pacific ocean perch primarily inhabit waters of the upper continental slope (Dark and Wilkins 1994) and are found along the edge of the continental shelf (Archibald et al. 1983). Pacific ocean perch occur as deep as 825 m, but usually are at 100 - 450 m and along submarine canyons and depressions (NOAA 1990). Larvae and juveniles are pelagic; subadults and adults are benthopelagic. Adults form large schools 30 m wide, to 80 m deep, and as much as 1,300 m long (NOAA 1990). They also form spawning schools (Gunderson 1971). Juvenile Pacific ocean perch form ball-shaped schools near the surface or hide in rocks (NOAA 1990). Throughout its range, Pacific ocean perch is generally associated with gravel, rocky or boulder type substrate found in and along gullies, canyons, and submarine depressions of the upper continental slope (Ito 1986).

Pacific ocean perch winter and spawn in deeper water (>275 m), then move to feeding grounds in shallower water (180-220 m) in the summer (June-August) as their gonads ripen (Archibald et al. 1983; Gunderson 1971; NOAA 1990). Pacific ocean perch are a slow-growing and long-lived species. The maximum age for Pacific ocean perch has been estimated at about 90 years (ODFW, personal communication). Largest size is about 54 cm and 2 kg (Archibald et al. 1983; Beamish 1979; Eschmeyer et al. 1983; Ito 1986; Mulligan and Leaman 1992; NOAA 1990; Richards 1994). Pacific ocean perch are carnivorous; larvae eat small zooplankton. Small juveniles eat copepods, and larger juveniles feed on euphausiids. Adults eat euphausiids,

shrimps, squids, and small fishes. Immature fish feed throughout the year, but adults feed only seasonally, mostly April-August (NOAA 1990). Predators of Pacific ocean perch include sablefish and Pacific halibut.

Bocaccio

Bocaccio rockfish (*Sebastes paucispinis)* ranges from Kodiak Island, Alaska to Sacramento Reef, Baja California. It is abundant off southern and central California and uncommon between Cape Mendocino and Cape Blanco, although a second population exists near the Oregon-Washington border and extends north to Cape Flattery. They are found at depths ranging from 50 to 300 m (Ralston et al. 1996) and are classified as a middle shelf-mesobenthal species.

Bocaccio frequent a exceptional variety of habitats including, kelp forests, rocky reefs, midwater, and open, low relief bottoms. Larvae and small juveniles are pelagic and are commonly found in the upper 100 m of the water column. In central California, post-pelagic larvae are associated with the giant kelp canopy and also seen throughout the water column. Moser et al. (2000) found relatively high average abundances of bocaccio larvae when surveying stations in the Point Conception and Channel Islands areas, in addition to, a station southwest of Santa Rosa, a station northeast of San Nicholas Island, and a station southwest of Point Conception.

Bocaccio have been categorized as both a nearshore and offshore species because they occupy different habitats depending on life stage. After spending their first year in shallow areas along the coast, bocaccio move into deeper habitats as they age. Large juvenile and adult bocaccio are semi-demersal, found in both rocky and non-rocky habitats, and have been known to occur around artificial structures. Love et al. (2000) found the highest density of adult bocaccio (10.5 fish/100 m^2) around an oil platform was greater than the highest density of bocaccio around a natural reef (4.4 fish/100 m^2).

While adult bocaccio are usually associated with rocky vertical relief, they are also found occurring over firm sand-mud bottom, in eelgrass beds, or congregated around floating kelp beds. In Soquel Canyon, California, adults were associated with mud-boulder, rock-mud, rock-ridge, and rock-boulder habitats (Yoklavich et al. 2000). Adult bocaccio have been known to aggregate and disperse quickly and may travel more than two km per day. Bocaccio movements may also have a seasonal component, as bocaccio disappear from traditional commercial fishing areas during winter spawning and return in the spring.

All life stages of bocaccio are found in euhaline waters and they may congregate in local areas of high salinity. Warm temperatures are preferred by larvae and high larval densities have been observed in waters of 12^0C and higher. However, average larval abundance declined abruptly during the shift from the cool regime (1951 - 1976) to the warm regime (1977 - 1998) of the Pacific Decadal Osillation (PDO) in the Southern California Bight region (Moser et al. 2000).

Darkblotched Rockfish

Darkblotched rockfish (*Sebastes crameri*) has a distribution extending from the Bering Sea to Santa Catalina Island, California (Allen and Smith 1988). Based on the location of commercial landings and NMFS triennial survey data, darkblotched rockfish are frequently encountered along the central Pacific Coast (Oregon and northern California). Because they can be found at depths ranging from 29 - 549 m (Rodgers et al. 2000), usually deeper than 76 m, they are managed in the FMP as part of the slope rockfish complex. Darkblotched rockfish are an important component of the commercial groundfish trawl fishery (Nichol and Pikitch 1994; Weinburg 1994). For this fishery, they comprise the deep-water assemblage, along with shortspine thornyhead, Pacific ocean perch, and splitnose rockfish (Weinburg 1994).

Darkblotched rockfish move into deeper water as they increase in size and age. Older larvae and pelagic juveniles are found closer to the surface than many other rockfish species (Love 2002). Off Oregon, benthic juveniles are taken at depths of 55 - 200 m. Adults have been found in water as shallow as 29 m, but are most abundant in the deeper portion of their range. In 1999, NMFS triennial survey data found that 91% of the estimated darkblotched rockfish biomass was found at depths between 180 - 360 m, with the remaining balance between 360 - 540 m (Rodgers et al. 2000).

Throughout their range, darkblotched rockfish are associated with mud and rock habitats. The greatest numbers of darkblotched larvae and pelagic juveniles are found 83 - 93 km offshore; juvenile darkblotched can be taken as far offshore as 194 km. Off central California, young darkblotched rockfish recruit to soft substrate and low relief. Demersal juveniles are often found perched on the highest structure in the benthic habitat (Love 2002). Adults are typically observed resting on mud, near cobble and boulders and do not often rise above the bottom (Love 2002). In Soquel Canyon, California, adults were most frequently associated with mud boulder, mud rock, rock mud, and mud cobble habitats (Yoklavich et al. 2000). Darkblotched rockfish make limited migrations once they recruit to the adult stock.

Darkblotched rockfish are viviparous (Nichol and Pickitch 1994). Insemination of female darkblotched rockfish occurs from August to December, fertilization and parturition occurs from December to March off Oregon and California, primarily in February off Oregon and Washington (Hart 1973; Nichol and Pickitch 1994; Richardson and Laroche 1979). Females attain 50% maturity at a greater size (36.5 cm) and age (8.4 years) than males (29.6 cm and 5.1 years) (Nichol and Pickitch 1994). Adults can grow to 57 cm (Hart 1973). Pelagic young are food for albacore (Hart 1973).

Sablefish

Sablefish (*Anoplopoma fimbria*) are abundant in the north Pacific, from Honshu Island, Japan, north to the Bering Sea, and southeast to Cedros Island, Baja California. There are at least three genetically distinct populations off the West Coast of North America: one south of Monterey characterized by slower growth rates and smaller average size, one that ranges from Monterey to the U.S./Canada border that is characterized by moderate growth rates and size, and one ranging off British Columbia and Alaska characterized by fast growth rates and large size. Large adults are uncommon south of Point Conception (Hart 1973; Love 1991; McFarlane and Beamish 1983a; McFarlane and Beamish 1983b; NOAA 1990). Adults are found as deep as 1,900 m, but

are most abundant between 200 and 1,000 m (Mason et al. 1983). Off southern California, sablefish were abundant to depths of 1500 m. Adults and large juveniles commonly occur over sand and mud (McFarlane and Beamish 1983a; NOAA 1990) in deep marine waters.

Spawning occurs annually in the late fall through winter in waters greater than 300 m (Hart 1973; NOAA 1990). Sablefish are oviparous with external fertilization (NOAA 1990). Eggs hatch in about 15 days (Mason et al. 1983; NOAA 1990) and are demersal until the yolk sac is absorbed (Mason et al. 1983). After yolk sac is absorbed, juveniles become pelagic. Older juveniles and adults are benthopelagic. Larvae and small juveniles move inshore after spawning and may rear for up to four years (Boehlert and Yoklavich 1985; Mason et al. 1983). Older juveniles and adults inhabit progressively deeper waters.

Sablefish larvae prey on copepods and copepod nauplii. Pelagic juveniles feed on small fishes and cephalopods, mainly squids (Hart 1973; Mason et al. 1983). Demersal juveniles eat small demersal fishes, amphipods and krill (NOAA 1990). Adult sablefish feed on fishes like rockfishes and octopus (Hart 1973; McFarlane and Beamish 1983a). Larvae and pelagic juvenile sablefish are heavily preyed upon by sea birds and pelagic fishes. Juveniles are eaten by Pacific cod, Pacific halibut, lingcod, spiny dogfish, and marine mammals, such as orcas (Cailliet et al. 1988; Hart 1973; Love 1991; Mason et al. 1983; NOAA 1990). Sablefish compete with many other co-occurring species for food, mainly Pacific cod and spiny dogfish (Allen 1982).

Yellowtail Rockfish

Yellowtail rockfish (*Sebastes flavidus*) range from San Diego, California, to Kodiak Island, Alaska (Fraidenburg 1980; Gotshall 1981; Lorz et al. 1983; Love 1991; Miller and Lea 1972; Norton and MacFarlane 1995). The center of yellowtail rockfish abundance is from Oregon to British Columbia (Fraidenburg 1980). Yellowtail rockfish are a common, demersal species abundant over the middle shelf (Carlson and Haight 1972; Fraidenburg 1980; Tagart 1991; Weinberg 1994). Yellowtail rockfish are most common near the bottom, but not on the bottom (Love 1991; Stanley et al. 1994). Yellowtail rockfish adults are considered semi-pelagic (Stanley et al. 1994; Stein et al. 1992) or pelagic, which allows them to range over wider areas than benthic rockfish (Pearcy 1992). Adult yellowtail rockfish occur along steeply sloping shores or above rocky reefs (Hart 1973). They can be found above mud with cobble, boulder and rock ridges, and sand habitats; they are not, however, found on mud, mud with boulder, or flat rock (Love 1991; Stein et al. 1992). Yellowtail rockfish form large (sometimes greater than 1,000 fish) schools and can be found alone or in association with other rockfishes (Love 1991; Pearcy 1992; Rosenthal et al. 1982; Stein et al. 1992; Tagart 1991). These schools may persist at the same location for many years (Pearcy 1992).

Yellowtail rockfish are viviparous (Norton and MacFarlane 1995) and mate from October to December. Parturition peaks in February and March and from November to March off California (Westrheim 1975). Young-of-the-year pelagic juveniles often appear in kelp beds beginning in April and live in and around kelp in midwater during the day, descending to the bottom at night (Love 1991; Tagart 1991). Male yellowtail rockfish are 34 cm to 41 cm in length (five years to nine years) at 50% maturity, females are 37 cm to 45 cm (six years to ten years) (Tagart 1991). Yellowtail rockfish are long-lived and slow-growing; the oldest recorded individual was 64 years old (Fraidenburg 1981; Tagart 1991). Yellowtail rockfish have a high

growth rate relative to other rockfish species (Tagart 1991). They reach a maximum size of about 55 cm in approximately 15 years (Tagart 1991). Yellowtail rockfish feed mainly on pelagic animals, but are opportunistic, occasionally eating benthic animals as well (Lorz et al. 1983). Large juveniles and adults eat fish (small Pacific whiting, Pacific herring, smelt, anchovies, lanternfishes, and others), along with squid, krill, and other planktonic organisms (euphausiids, salps, and pyrosomes) (Love 1991; Phillips 1964; Rosenthal et al. 1982; Tagart 1991).

3.3.3 Non-Groundfish Species

Two species managed under the Coastal Pelagic Species Fishery Management Plan were also incidentally taken in the 2003 shore-based whiting fishery, jack mackerel and Pacific mackerel. Like whiting, these are schooling fish that migrate in coastal waters and are not associated with the ocean bottom. The incidental catch of these species in the 2003 shore-based whiting fishery was as follows: 67,920 kg of jack mackerel and 420 kg of Pacific mackerel (Wiedoff et al. 2003).

Endangered Species

Pacific Coast marine species listed as endangered or threatened under the ESA are discussed in the salmon resources, marine mammal, seabird, and sea turtle sections. Under the ESA, a species is listed as "endangered" if it is in danger of extinction throughout a significant portion of its range and "threatened" if it is likely to become an endangered species within the foreseeable future throughout all, or a significant portion, of its range.

Marine Mammals

The waters off Washington, Oregon, and California (WOC) support a wide variety of marine mammals. Approximately thirty species, including seals and sea lions, sea otters, and whales, dolphins, and porpoise, occur within the EEZ. Many marine mammal species seasonally migrate through Pacific Coast waters, while others are year round residents.

Species Listed as Endangered Under the ESA
Sperm whale (*Physeter macrocephalus*),
Humpback whale (*Megaptera novaeangliae*),
Blue whale (*Balaenoptera musculus*), and
Fin whale (*Balaenoptera physalus*).

Species Listed as Threatened Under the ESA
Steller sea lion (*Eumetopias jubatus*)Eastern Stock,
Guadalupe fur seal (*Arctocephalus townsendi*), and
Southern sea otter (*Enhydra lutris*) California Stock.

Species Listed as Depleted under the MMPA
Northern fur seal (*Callorhinus ursinus*) Eastern Pacific Stock and
Killer whale (*Orcinus orca*) Eastern North Pacific Southern Resident Stock.

The Marine Mammal Protection Act (MMPA) and the ESA are the Federal legislation that guide marine mammal species protection and conservation policy. Under the MMPA on the West Coast, NMFS is responsible for the management of cetaceans and pinnipeds, while the U.S. Fish and Wildlife Service (USFWS) manages sea otters. Stock assessment reports review new information every year for strategic stocks (those whose human-caused mortality and injury exceeds the potential biological removal (PBR)) and every three years for non-strategic stocks. Marine mammals

whose abundance falls below the optimum sustainable population (OSP) are listed as "depleted" according to the MMPA.

Fisheries that interact with species listed as depleted, threatened, or endangered may be subject to management restrictions under the MMPA and ESA. NMFS publishes an annual list of fisheries in the Federal Register separating commercial fisheries into one of three categories, based on the level of serious injury and mortality of marine mammals occurring incidentally in that fishery. The categorization of a fishery in the list of fisheries determines whether participants in that fishery are subject to certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements. The Washington/Oregon/California (WOC) groundfish fisheries are in Category III, indicating a remote likelihood of, or no known serious injuries or mortalities, to marine mammals.

Seabirds

The highly productive California Current System, an eastern boundary current that stretches from Baja Mexico to southern British Columbia, supports more than two million breeding seabirds and at least twice that number of migrant visitors. Tyler et al. (1993) reviewed seabird distribution and abundance in relation to oceanographic processes in the California Current System and found that over 100 species have been recorded within the EEZ including: albatross, shearwaters, petrels, storm-petrels, cormorants, pelicans, gulls, terns and alcids (murres, murrelets, guillemots, auklets and puffins). In addition to these "classic" seabird, millions of other birds are seasonally abundant in this oceanic habitat including: waterfowl, waterbirds (loons and grebes), and shorebirds (phalaropes). Not surprisingly, there is considerable overlap of fishing areas and areas of high bird density in this highly productive upwelling system. The species composition and abundance of birds varies spatially and temporally. The highest seabird biomass is found over the continental shelf and bird density is highest during the spring and fall when local breeding species and migrants predominate.

Species Listed as Endangered Under the ESA
Short-tail albatross (*Phoebastria albatrus*),
California brown pelican (*Pelecanus occidentalis*), and
California least tern (*Sterna antillarum browni*).

Species Listed as Threatened Under the ESA
Marbled murrelet (*Brachyramphs marmoratus*).

The USFWS is the primary Federal agency responsible for seabird conservation and management. Under the Magnuson-Stevens Act, NMFS is required to ensure fishery management actions comply with other laws designed to protect seabirds. NMFS is also required to consult with USFWS if fishery management plan actions may affect seabird species listed as

Seabirds Listed by the USFWS as Birds of Conservation Concern

Black-footed albatross (*Phoebastria nigripes*)
Ashy storm-petrel (*Oceanodroma homochroa*)
Gull-billed tern (*Sterna nilotica*)
Elegant tern (*Sterna elegans*)
Arctic Tern (*Sterna paradisaea*)
Black skimmer (*Rynchops niger*)
Xantus's murrelet (*Synthliboramphus hypoleucus*)

endangered or threatened.

Sea Turtles
Sea turtles are highly migratory and four of the six species found in U.S. waters have been sighted off the Pacific Coast. Little is known about the interactions between sea turtles and West Coast commercial fisheries. The directed fishing for sea turtles in WOC groundfish fisheries is prohibited, because of their ESA listings, but the incidental take of sea turtles by trawl gear may occur. The management and conservation of sea turtles is shared between NMFS and USFWS.

Species Listed as Endangered Under the ESA
Green turtle (*Chelonia mydas*),
Leatherback turtle (*Dermochelys coriacea*), and
Olive ridely turtle (*Lepidochelys olivacea*).

Species Listed as Threatened Under the ESA
Loggerhead turtle (*Caretta caretta*)

3.4 Physical Characteristics of the Affected Resource

3.4.1 California Current System
In the North Pacific Ocean, the large, clockwise-moving North Pacific Gyre circulates cold, sub-arctic surface water eastward across the North Pacific, splitting at the North American continent into the northward-moving Alaska Current and the southward-moving California Current. Along the U.S. West Coast, the surface California Current flows southward through the U.S. West Coast EEZ, the management area for the groundfish FMP. The California Current is known as an eastern boundary current, meaning that it draws ocean water along the eastern edge of an oceanic current gyre. Along the continental margin and beneath the California Current flows the northward-moving California Undercurrent. Influenced by the California Current system and coastal winds, waters off the U.S. West Coast are subject to major nutrient upwelling, particularly off Cape Mendocino (Bakun 1996). Shoreline topographic features such as Cape Blanco, Point Conception, and bathymetric features such as banks, canyons, and other submerged features, often create large-scale current patterns like eddies, jets, and squirts. Currents off Cape Blanco, for example, are known for a current "jet" that drives surface water offshore to be replaced by upwelling sub-surface water (Barth et al. 2000). One of the better-known current eddies off the West Coast occurs in the Southern California Bight between Point Conception and Baja California (Longhurst 1998), wherein the current circles back on itself by moving in a northward and counterclockwise direction just within the Bight. The influence of these lesser current patterns and of the California Current on the physical and biological environment varies seasonally (Lynn 1987) and through larger-scale climate variation, such as El Niño-La Niña or Pacific Decadal Oscillation (Longhurst 1998).

3.4.2 Essential Fish Habitat. The 80 plus groundfish species managed by the FMP occur throughout the EEZ and occupy diverse habitats at all stages in their life histories. Some species are widely dispersed during certain life stages, particularly those with pelagic eggs and larvae; the essential fish habitat (EFH) for these species/stages is correspondingly large. On the other hand, the EFH of some species/stages may be comparatively small, such as that of adults of

many nearshore rockfishes which show strong affinities to a particular location or type of substrate.

EFH for Pacific coast groundfish is defined as the aquatic habitat necessary to allow for groundfish production to support long-term sustainable fisheries for groundfish and for groundfish contributions to a healthy ecosystem. Descriptions of groundfish fishery EFH for each of the 80 plus groundfish species and their life stages result in over 400 EFH identifications. When these EFHs are taken together, the groundfish fishery EFH includes all waters from the mean higher high water line, and the upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon, and California seaward to the boundary of the U.S. EEZ.

The FMP groups the various EFH descriptions into seven major habitat types called "composite" EFHs. This approach focuses on ecological relationships among species and between the species and their habitat, reflecting an ecosystem approach in defining EFH. The seven "composite" EFH identifications are as follows:

1. Estuarine - Those waters, substrates and associated biological communities within bays and estuaries of the EEZ, from mean higher high water level (MHHW, which is the high tide line) or extent of upriver saltwater intrusion to the respective outer boundaries for each bay or estuary as defined in 33 CFR 80.1 (Coast Guard lines of demarcation).

2. Rocky Shelf - Those waters, substrates, and associated biological communities living on or within ten meters (5.5 fathoms) overlying rocky areas, including reefs, pinnacles, boulders and cobble, along the continental shelf, excluding canyons, from the high tide line MHHW to the shelf break (~200 meters or 109 fathoms).

3. Nonrocky Shelf - Those waters, substrates, and associated biological communities living on or within ten meters (5.5 fathoms) overlying the substrates of the continental shelf, excluding the rocky shelf and canyon composites, from the high tide line MHHW to the shelf break (~200 meters or 109 fathoms).

4. Canyon - Those waters, substrates, and associated biological communities living within submarine canyons, including the walls, beds, seafloor, and any outcrops or landslide morphology, such as slump scarps and debris fields.

5. Continental Slope/Basin - Those waters, substrates, and biological communities living on or within 20 meters (11 fathoms) overlying the substrates of the continental slope and basin below the shelf break (~200 meters or 109 fathoms) and extending to the westward boundary of the EEZ.

6. Neritic Zone - Those waters and biological communities living in the water column more than ten meters (5.5 fathoms) above the continental shelf.

7. Oceanic Zone - Those waters and biological communities living in the water column more than 20 meters (11 fathoms) above the continental slope and abyssal plain, extending to the westward boundary of the EEZ.

Life history and habitat needs for the 80 plus species managed under the FMP are described in the EFH appendix to Amendment 11, which is available online at http://www.nwr.noaa.gov/1sustfsh/efhappendix/page1.html

NMFS is drafting a new EIS on West Coast Groundfish EFH. Information on the drafting process is available at http://www.nwr.noaa.gov/1sustfsh/groundfish/eis_efh/efh/

The shore-based whiting fishery typically occurs off the coasts of Washington, Oregon, and northern California. Because the proposed action is a monitoring program, it is not predicted to affect the physical characteristics of the Pacific Coast groundfish fishery.

4.0 ANALYSIS OF THE ALTERNATIVES

4.1 Introduction

This chapter describes the effects of the proposed action, establishing full retention and monitoring requirements in the shore-based whiting fishery, on the Pacific Coast groundfish fishery. Effects are analyzed in the order that they are affected by the proposed action. Therefore, those resources most affected are discussed first, followed by those resources that are least affected. Effects on the socioeconomic environment are analyzed in Chapter 4.2, effects on the biological environment are analyzed in Chapter 4.3, and effects on the physical environment are analyzed in Chapter 4.4.

4.2 Effects on the Socioeconomic Environment

There are three primary socioeconomic considerations when establishing full retention and monitoring requirements in the shore-based whiting fishery on the Pacific Coast groundfish fishery. These socioeconomic considerations are: establishing or not establishing full retention requirements in the shore-based monitoring program, the costs associated with different full retention and monitoring programs that may be established in shore-based fishery, and economic effects of full retention and monitoring requirements on the shore-based whiting fishery.

4.2.1 Establishing Full Retention and Monitoring Requirements in the Shore-based Fishery

As discussed in Chapter One, there are several needs for establishing full retention and monitoring requirements in the shore-based whiting fishery. The different options available to establish retention and monitoring requirements are not predicted to be substantial, but retention and monitoring requirements will vary with alternatives.

Under Alternative 1 (No Action Alternative), there would be no provisions for full retention in the shore-based fishery. Therefore, the shore-based whiting vessels would be subject to the groundfish trawl cumulative trip limits specified in Federal regulations and would be required to sort their catch at sea. Monitoring in the shore-based whiting fleet would be included in the Observer Program's coverage plan for the groundfish trawl fleet. This alternative does not provide for full retention in the shore-based whiting fishery, therefore, it does not meet the needs of the proposed action and should not be considered as a preferred alternative.

Under Alternative 2 (Status Quo), the annual process of issuing exempted fishing permits (EFPs) would continue as it has for over a decade. Full retention and monitoring requirements would be specified in EFPs that are issued to participants in the shore-based whiting fishery on an annual basis. By definition, EFPs authorize fishing for groundfish in a manner that would otherwise be prohibited for limited, experimental purposes (50 CFR 679.6.) Thus, EFPs are intended to provide for limited testing of a fishing strategy, gear type, or monitoring program that may eventually be implemented on a larger fleet-wide scale and are not a permanent solution to the monitoring needs of the shore-based whiting fishery. Because of the success of the shore-based whiting EFP, indicating that it is feasible to retain and monitor the incidental take of salmon and groundfish species in the shore-based whiting fishery, it is now appropriate to establish full

retention and monitoring for salmon and other non-target species incidentally taken in the shore-based whiting fishery in Federal regulations. This alternative is not in keeping with the intended use of EFPs, therefore, it should not be considered as a preferred alternative.

Under Alternative 3 (Federal Monitoring), full retention and monitoring requirements for the shore-based whiting fishery would be specified in Federal regulation. This alternative meets the needs of the proposed action, including establishing a standardized reporting methodology to assess the type and amount of bycatch occurring in the shore-based whiting fishery, satisfying the terms and conditions of the 1992 Biological Opinion, and maintaining the integrity of groundfish rebuilding plans. This alternative also satisfies the purposes of the proposed action, including establishing full retention in the shore-based fishery, reducing discard in the shore-based fishery by allowing the landing of prohibited species and groundfish taken in excess of trip limits, and by developing a full retention monitoring program. Therefore, this alternative should be considered for designation as a preferred alternative.

Under Alternative 4 (Combination Monitoring), full retention and monitoring requirements for the shore-based whiting fishery would be specified in Federal regulation. Because electronic monitoring is a relatively new technology, standards for data confidentiality and privacy issues are still being developed for this type of monitoring. When implementing Alternative 4, it is important that Federal regulations reflect current NMFS policy on electronic monitoring and are designed to protect both data confidentiality and the privacy of vessel owners. Much like Alternative 3, Alternative 4 meets the needs and satisfies the purposes of the proposed action and should be considered for designation as a preferred alternative.

4.2.2 The Cost of Full Retention and Monitoring Programs

The cost of full retention and monitoring is an important issue to consider when establishing these requirements in the shore-based whiting fishery. Similarly, it is important to carefully consider how costs associated with full retention and monitoring requirements are funded. The costs associated with implementing a monitoring program are not expected to be substantial, but the cost of full retention and monitoring requirement will vary with alternatives.

Under Alternative 1 (No Action Alternative), there would be no provisions for full retention in the shore-based fishery and the shore-based whiting fleet would be subject to the groundfish trawl cumulative trip limits. Monitoring in the shore-based whiting fleet would be provided for in the Observer Program's coverage plan for the groundfish trawl fleet and would be Federally funded. The estimated cost to the Federal government of Alternative 1 is $51,000 (see Table 4.2.2.1 for a break-down of costs).

Under Alternative 2 (Status Quo), the cost of the SWOP in 2005 is estimated at about $148,000. This cost is based on SWOP costs over the last few years and provides for coordination/data analysis, observer coverage, and administrative costs (see Table 4.2.2.1 for a break-down of costs). Over the last decade, the cost of this program has been shared between management agencies and the shore-based whiting fishery. Budget reductions in 2003 and projected budget reductions in 2004 are expected to affect the money that would be available to fund this program. Both state and Federal budgets for fisheries management have been reduced from historical levels and these reductions may make it difficult for continuing funding from these management

agencies. The cost of the monitoring program under Alternative 2 is more than under Alternative 1 but less than under all other Alternatives.

Under Alternative 3 (Federal Monitoring), the cost of a Federal monitoring program for the shore-based whiting fleet in 2005 is estimated at about $690,000. The cost provides for 100% observer coverage on all shore-based whiting trips, observers sampling 10% - 50% of shore-based whiting deliveries, and Federal enforcement personnel tracking overage and donation fish (see Table 4.2.2.1 for a break-down of costs). Under Option 3A(1) and Option 3B(1), the cost of monitoring in the shore-based whiting fishery would be covered by the Federal government. At the present time, the Observer Program does not have the necessary staff to monitor the shore-based whiting fishery. If the Observer Program provided monitoring for the shore-based whiting trips, resources would be diverted from other sectors of the Pacific Coast groundfish fishery during the shore-based whiting primary season, which could compromise the collection of data needed for effective management of the Pacific Coast groundfish fishery. Under Option 3A(2) and Option 3B(3), the shore-based whiting fleet would fund observer coverage on all shore-based whiting trips through a no cost contract. While whiting is a high volume species, it commands a relatively low price per pound. The annual estimated revenue over the last five years of whiting landed by the shore-based fleet is approximately 6 million dollars and per catcher vessel is approximately $181,000. If the shore-based whiting fleet were responsible for funding observer coverage on all shore-based whiting trip, the cost associated with the monitoring could represent a substantial portion of their annual income. Under Option 3B(2), the states of Washington, Oregon, and California would provide the funding for the sampling of shore-based whiting deliveries at processing plants. The states have experienced severe budget reductions in 2003 and 2004, with budgets for 2005 expected to be similarly restrictive. At the present time, the states do not have the financial resources to fund this program. The cost of the monitoring program under Alternative 3 is greater than under all other alternatives.

Under Alternative 4 (Combination Monitoring), the cost of a combination monitoring program for the shore-based whiting fleet in 2005 is estimated at about $410,000. The cost provides for 100% electronic monitoring coverage on all shore-based whiting trips, groundfish observers and/or state samplers sampling 10% - 50% of shore-based whiting deliveries, and a combination of Federal and state enforcement personnel tracking overage and donation fish (see Table 4.2.2.1 for a break-down of costs). Under Option 4A(1) and Option 4B(1), the cost of monitoring in the shore-based whiting fishery would be covered by the Federal government. Under Option 4A(2) and Option 4B(3), the shore-based whiting fleet would fund observer coverage on all shore-based whiting trips through no cost contract. Under Option 4B(2), the states of Washington, Oregon, and California would provide funding for the sampling of shore-based whiting deliveries at processing plants. Government budget reductions in 2003 and 2004 and projected budget reductions in 2005 are expected to affect the money that would be available to fund this program. Both state and Federal budgets have been reduced from historical levels and these reductions may make it difficult for continuing funding from these management agencies. The cost of the monitoring program under Alternative 4 is less than Alternative 2 but more than under all other Alternatives.

Table 4.2.2.1. Estimate of costs associated with the full retention monitoring programs for the shore-based whiting fishery.

Aspects of a Monitoring System	Alternative 1 (No Action Alternative)	Alternative 2 (Staus Quo)	Alternative 3 (Federal Monitoring)	Alternative 4 (Combination Monitoring)
Verifying Full Retention	$250 / day for groundfish observers and catch sampling 30 vessels 60 day fishery 10% trips covered $6,000 (admin support) = $51,000	No sampling = $0	$250 / day for groundfish observers and full retention monitoring 30 vessels 60 day fishery 100% trips covered $30,000 (admin support) = $480,000	$50 / day for electronic monitoring and full retention monitoring 30 vessels 60 day fishery 100 % trips covered $80,000 (admin support) = $170,000
Tracking and sampling prohibited species and overfished groundfish species in processing plants	No sampling = $0	$150 / day 10 port samplers 60 day fishery 10% - 35% of deliveries sampled $38,000 (admin support) = $128, 000	$250 / day 10 groundfish observers 60 day fishery 10% - 50 % of deliveries sampled $30,000 (admin support) = $180,000	$250 / day 10 groundfish observers or monitors 60 day fishery 10% - 50% of deliveries sampled $30,000 (admin support) = $180,000
Tracking overage/donation fish and the money paid for those fish	$0	$20,000	$30,000	$30,000
Total	$51,000	$148,000	$690,000	$410,000

4.2.3 Economic Effects on the Shore-based Whiting Industry

Possible economic impacts to the Pacific whiting industry are a function of costs imposed upon the industry as a result of monitoring requirements and changes in product quality if sorting at sea is required. Additional costs will decrease revenues, as will requiring vessels to sort at sea. Depending on changes in revenues or the level of costs borne by the fishing sector, some vessels may choose not to participate in the fishery, resulting in a longer season than what may

otherwise be the case. If the fishing sector has additional costs imposed upon them, fishers may demand higher prices from processors, resulting in a de-facto cost sharing between the fishing and processing sector. This would have consequences on the processing sector as well. Depending on the level of compensation to fishers, some processors may choose not to buy Pacific whiting, or may place vessels on trip limits in order to spread out the processing season and decrease costs elsewhere. For example, a longer processing season may require less peak demand/overtime labor, resulting in lower labor costs.

Table 4.2.2.2 Average Historic Revenues and Alternative Costs at the Vessel Level

Variable	Variable Type	Alt. 1	Alt. 2	Alt. 3(A2,B3)	Alt. 4(A2,B3)
Cost	Total Additional Program Cost	NONE	NONE	$690,000	$370,000
	Avg. Additional Vessel Cost	NONE	NONE	$480,000	$170,000
	Avg. Additional Shoreside Cost	NONE	NONE	$180,000	$180,000
	Avg. Additional Other Cost	NONE	NONE	$30,000	$30,000
Revenue	Average Total Vessel Revenue	UNKN	$5,741,969	$5,741,969	$5,741,969
Percentage	Avg. Vessel Cost as a Percent of Avg. Vessel Revenue	-	-	8.4%	3.0%
	Program Cost as a Percent of Avg. Vessel Revenue	-	-	12.0%	6.4%

source: PacFIN 2004

Note: a "-" means there is no calculation that can be made for the alternative

The amount of total gross revenue generated by the shore-based whiting fleet is unlikely to change in all alternatives other than Alternative 1 since it is likely the fleet will still be able to catch its allotted tonnage. However, industry net revenues may change depending on the alternative. Possible impacts include: changes in net revenues, vessel participation, and season length. In this section of the document, analysis is provided showing possible impacts to the fishing sector from additional costs imposed by a new monitoring program. Table 4.2.2.2 shows the costs across alternatives, average 1998 - 2003 ex-vessel revenues, and alternative costs as a percentage of those revenues. For example, compared to average ex-vessel revenues from 1998 - 2003, Alternative 3(A2,3B) vessel costs would equal approximately 8.4%. In 2004, a substantial increase in the shore-based allowable catch was permitted. Anecdotal evidence suggests that ex-vessel prices will be lower than in 2003. Assuming 2004 prices will be $0.01 lower than 2003, and that program costs would be the same in 2004 as shown in Table 4.2.2, then Alternative 3 vessel costs would vessel costs would equal approximately 5.3% of ex-vessel revenues, and Alternative 4 vessel costs would represent approximately 1.9% of ex-vessel revenues.

In some fisheries, the industry may be able to pass additional costs on to the consumer of the good. However, Pacific whiting fishers and processors are best described as “price takers” when it pertains to the sale of goods manufactured from the Pacific whiting resource. Goods produced from Pacific whiting compete - and can be substituted with - nearly identical goods produced from Alaska pollock, Atlantic Blue whiting, and Seafin bream, for example. An increase in the price of Pacific whiting products to the consumer would most likely induce consumers to switch consumption away from Pacific whiting toward a substitute such as Alaska pollock. Due to the number and quantity of nearly identical substitutes, it is unlikely that the Pacific whiting industry will be able to pass program costs on to the consumer, and instead will be forced to bear the

entire program costs themselves if government sources do not fund the cost of the program. Under a new cost structure, some changes in fleet characteristics may occur, including changes in the number of vessels participating in the fishery, and changes in season length. Although anecdotal evidence suggests that profit margins gained by Pacific whiting vessels are low, there are no data available to verify an actual value. The most widely used profit margin estimates reside in the Research Group's Fisheries Economic Assessment Model which estimates profit margins for the class of large groundfish trawlers as approximately 10 percent (The Research Group, Corvallis, Oregon, 2004, personal communication). Therefore, the estimate for analytical purposes in this document are impacts associated with a ten percent profit margin. However, a range of possible profit margins is presented along with the change in number of vessels and change in season length (if applicable) from additional costs imposed upon the fleet. One of the main assumptions used to determine when vessels may leave the fishery is based on the notion that commercial fishers will work to build catch history in anticipation of an ITQ program as long as doing so does not result in a zero or negative profit margin. This approach is used because the Council has recently begun discussions of a trawl individual quota program, which may motivate whiting fishers to behave in a manner that will build catch history. Fishers operating under the presumption that catch history during the current and future time period will count toward quota shares under a quota program will behave in a manner to retain and build current and future capital assets. The expectation that future capital wealth will result from fishing activity, or that a lack of activity can diminish capital wealth, can act in place of current monetary wealth from fishing activities. This may work to make a low rate of return from fishing activities palatable to those remaining in the fishery, and make participation in the whiting fishery higher than what may otherwise be the case.

Table 4.2.2.3 uses the above assumptions to show the impact of the alternatives. This analysis has taken into account vessels that were bought out through the buyback program, and assumes that vessels remaining in the general groundfish fishery do not move to fill the voids left by those vessels that exited the whiting fishery through the buyback. Therefore, although Alternative 1 represents the status quo, adjustments have been made to the average number of vessels and average season length by factoring out the 4 active vessels that were eliminated through the buyback program. Over the 1998 - 2003 period, the average number of vessels participating in the shore-based whiting fishery was 32, and the average season length was 72 days. After factoring out 4 vessels, the average number of vessels participating would have been 29 per year (the four vessels that were bought out did not participate in the whiting fishery each year) and the average season length would have increased to 79 days. Table 4.2.3 below is organized in a fashion that examines each alternative in rows, each type of impact in sub-rows, and the result of various profit margins in columns.

Table 4.2.2.3 shows the results of analysis under several possible vessel profit margins. This analysis is only applicable to industry funded alternatives, and only pertains to the vessel portion of each alternative. Although industry funded alternatives may also impact the processing sector, there are no data available to estimate impacts to that sector.

The analysis shows that under an industry funded options of Alternative 3 and 4 Alternative 4, changes may occur in the Pacific whiting fleet and this may be reflected in fewer vessels and a longer season length. This result is projected over the 1998 - 2003 period and represents what the fishery would have looked like had the alternatives been in place during that period.

Table 4.2.2.3 Average Number of Vessels and Season Length by Alternative and Assumed Profit Margin					
Alternative	Measure	Assumed Profit Margin			
		0%	5%	10%	20%
Alt. 1 (No Action)	Avg. No. of Vessels	UNKN	UNKN	UNKN	UNKN
	Avg. Season Length	UNKN	UNKN	UNKN	UNKN
Alt. 2 (Status Quo)	Avg. No. of Vessels	29	29	29	29
	Avg. Season Length	79	79	79	79
Alt. 3(A2,B3) (Federal Observers)	Avg. No. of Vessels	26	28	29	29
	Avg. Season Length	88	82	79	79
Alt. 4(A2,3B) (Combination Monitoring)	Avg. No. of Vessels	28	29	29	29
	Avg. Season Length	82	79	79	79

Another socioeconomic effect of implementing a monitoring system in the shore-based fishery is a monitoring program's ability to track the money exchanged for and/or donation of landings of groundfish taken in excess of trip limits and the prohibited species (i.e., salmon). With an effective monitoring system in place to track the money associated with the sale of these fish and the donation of these fish, there would be less incentive for fishers to target and land groundfish in excess of trip limits or prohibited species in order to receive a profit.

4.3 Effects on the Biological Environment

The biological effects of implementing a monitoring program in the shore-based whiting fishery on the Pacific Coast groundfish fishery include such things as monitoring system coverage levels, the tracking and sampling of salmon incidentally taken in the shore-based fishery, and the tracking and sampling of overfished species incidentally taken in the shore-based fishery. Implementing a monitoring program in the shore-based fishery will also affect what is known about interactions between the shore-based whiting fishery and non-groundfish species, marine mammals, seabirds, and sea turtles.

4.3.1 Monitoring System Coverage Levels

Coverage levels play an important role in determining the effectiveness and cost of a monitoring program of monitoring program. As discussed in Chapter Two, NMFS determined that a level of 100% monitoring (i.e., all shore-based whiting vessels would be monitored on all trips for full retention of catch) is the only monitoring level appropriate for accurately documenting compliance with full retention. In the shore-based whiting fishery, catch of prohibited species and overfished species are rare and intermittent, therefore, any discarding at sea of these species would also be rare and intermittent. As only high levels of monitoring are appropriate for documenting rare and intermittent events, NMFS's decision to only consider a level of 100% monitoring for verification of full retention is further supported. As an appropriate level of monitoring for the sampling of prohibited species and overfished groundfish species at processing plants is still being analyzed , this EA analyzes a range of dockside monitoring levels.

The effect of different monitoring system coverage levels on the socio-economic environment of the Pacific Coast groundfish fishery is discussed in Chapter 4.2.2 of this EA. Therefore, the discussion in this section will focus on how coverage levels, and their direct influence on the

quantity and/or quality of data collected under the different monitoring alternatives, affect the biological resources of the Pacific Coast groundfish fishery.

Under Alternative 1 (No Action Alternative), there would be no provisions for full retention in the shore-based fishery. Therefore, the shore-based whiting fleet would be subject to the groundfish trawl cumulative trip limits and required to sort their catch at sea. Monitoring in the shore-based whiting fleet would be provided for in the Observer Program's coverage plan for the groundfish trawl fleet. Shore-based whiting vessels would be randomly selected to carry NMFS groundfish observers with approximately 10% of the shore-based whiting fleet receiving at-sea observer coverage in 2005. Because catch would be sorted at sea, there would be no sampling for prohibited or overfished species or tracking of overage/donation fish at the processing plants where shore-based whiting catch is landed. Coverage levels would be similar to those under Alternative 2 but less than those under all other Alternatives.

Under Alternative 2 (Status Quo), the Shoreside Whiting Observer Program (SWOP) has adjusted their sampling goals and coverage requirements over time to meet the needs of fishery managers and keep costs within the available budget. The SWOP would not provide coverage aboard the shore-based whiting vessels but would continue to sample 10% - 35% of shore-based deliveries to processing plants. State and Federal enforcement personnel would track overage/donation fish and the money paid for those fish. Coverage levels under Alternative 2 would be similar to those under Alternative 1 but less than those under all other Alternatives.

Under Alternative 3 (Federal Monitoring), the proposed coverage levels are based on the level of monitoring necessary to satisfy compliance with full retention requirements and the level of monitoring necessary to effectively track and sample prohibited and overfished species at processing plants. Under Alternative 3, Federal observers would cover 100% of shore-based whiting trips (approximately 600 - 700) per season to verify full retention of catch. Because several groundfish species have been declared overfished, including several species incidentally taken in the shore-based whiting fishery (e.g., widow rockfish, canary rockfish, Pacific ocean perch, darkblotched rockfish, bocaccio, and lingcod), tracking the total mortality of these species is important. Additionally, providing observer coverage on some but not all whiting trips may result in differential fishing strategies. For example, vessels with observers onboard might be more likely to fish in areas known to have lower rockfish encounter rates and/or retain all their catch than vessels without observers. Therefore, 100% observer coverage on shore-based whiting trips would aid in quantifying the total mortality of overfished species and ensure accurate data. The proposed sampling levels at processing plants under Alternative 3 would likely be at least 10% and less than 50% of the deliveries. Having between 10% - 50% of deliveries sampled would ensure that both salmon and overfished groundfish species are accurately quantified and sampled. Federal enforcement personnel would track overage/donation fish and the money paid for those fish. Coverage levels under Alternative 3 would be better/similar to those under Alternative 4 and greater than those under Alternative 1 and Alternative 2.

Under Alternative 4 (Combination Monitoring), the proposed coverage levels are also based on the level of monitoring necessary to satisfy compliance with full retention requirements as well

as the level of monitoring necessary to effectively track and sample prohibited and overfished species at processing plants. Under Alternative 4, an electronic monitoring system would be installed on each shore-based whiting vessel for the duration of the shore-based whiting primary season. This electronic monitoring system would observe 100% of shore-based whiting trips and verify full retention of catch. While an electronic monitoring system could be used to verify whether catch was dumped at sea, it probably could not be used to quantify the amount of catch dumped or estimate the species composition of catch dumped. Under Alternative 4, state samplers and/or groundfish observers would observe a portion of shore-based whiting deliveries made to plants. Similar to Alternative 2, that portion would likely be at least 10% and less than 50% of the deliveries. State and Federal enforcement personnel would track overage/donation fish and the money paid for those fish. Coverage levels under Alternative 4 would be similar/less than to those under Alternative 3 and greater than those under Alternative 1 and Alternative 2.

4.3.2 Salmon Resources

As discussed in Chapter 1, one need for the proposed action is to track and sample salmon species incidentally taken in the shore-based whiting fishery. The August 1992 Biological Opinion analyzing the effects of the Pacific Coast groundfish fishery on salmon stocks listed under the ESA requires the Pacific Council to provide for monitoring of the salmon incidentally taken in the midwater trawl whiting fishery (NMFS 1992). Currently, the need for monitoring in the whiting fishery is based on not jeopardizing the existence of threatened Snake River fall chinook, lower Columbia River chinook, upper Willamette River chinook, and Puget Sound chinook (NMFS 2002). Monitoring needs could change if additional salmon species were listed or as additional incidental take data are needed for other management purposes.

The effects of the alternatives (i.e., different monitoring programs for the shore-based whiting fishery) on salmon resources include both direct and indirect effects. The direct effects would include the acquired knowledge and understanding of salmon incidentally taken in the shore-based fishery. For example, knowledge about whether salmon are discarded at sea or whether all captured salmon are delivered to the processing plants. Having this type of information would enable fishery managers to make informed management decisions with respect to managing the total mortality of salmon. Additionally, sampling the salmon at processing plants would provide such information as species, age, length, weight, number, and maturity of those salmon that are incidentally taken in the shore-based whiting fishery. The indirect effects of the proposed action on salmon resources will depend on how the information collected by the monitoring program is used. For example, if the incidental take of salmon, specifically chinook salmon, in the shore-based whiting fishery is higher than originally thought, it may result in a re-evaluation of the biological opinion that set the allowable chinook salmon threshold. This information may also result in an effort to minimize the total mortality of chinook salmon, perhaps by reducing the directed harvest of chinook salmon or reducing the season length or fishing area for the whiting fishery.

Because the proposed action is a monitoring program, all alternatives are predicted to have minimal effects on Pacific Coast salmon species. However, the effects on knowledge and understanding of salmon incidentally taken in the shore-based whiting may vary with the type of monitoring program implemented in the shore-based whiting fishery.

Without any full retention provisions for the shore-based whiting fleet, Alternative 1 (No Action Alternative) would result in the shore-based whiting fleet sorting their catch at sea and discarding incidentally taken salmon species as soon as possible. Because the shore-based whiting fleet would be subject to groundfish trawl cumulative trip limits, shore-based whiting vessels would be part of the Observer Program's observer coverage plan for the groundfish trawl fleet. Therefore, NMFS groundfish observers would observe approximately 10% of the shore-based whiting fleet in 2005. When groundfish observers are aboard a shore-based whiting trip, they would collect data (i.e., species, age, length, weight , number, maturity) on salmon species incidentally taken in the shore-based whiting fishery. However, groundfish observers would likely only cover approximately 10% of shore-based whiting trips, therefore, there would be no salmon data collected during approximately 90% of the shore-based whiting trips. Alternative 1 is predicted to generate less information on salmon species incidentally taken in the shore-based whiting fishery than all other Alternatives.

Alternative 2 (Status Quo) would continue the sampling regime for incidentally taken salmon established by the SWOP. There would be no coverage aboard shore-based whiting trips, to verify whether all incidentally taken salmon are retained, but between 10% - 35% of shore-based whiting deliveries at processing plants would be sampled for salmon. Data such as species, age, length, weight , number, and maturity would be collected from those salmon that are incidentally taken in the shore-based whiting fishery, retained, and delivered to processing plants. Salmon delivered to processing plants would be available to local charitable food donation organizations. Alternative 2 is predicted to generate more information on salmon species incidentally taken in the shore-based whiting fishery than Alternative 1 but less information than all other Alternatives.

Under Alternative 3 (Federal Monitoring), there would be 100% observer coverage on shore-based whiting trips to verify whether all captured salmon were retained and sampled at the plant or whether salmon were discarded are sea. If salmon were discarded at sea, it may be possible for observers to determine which salmon species were discarded and to estimate the quantity discarded. Groundfish observers would also sample 10% - 50% of shore-based whiting deliveries at processing plants to collect such information as species, age, length, weight, number, and maturity from those salmon that are incidentally taken in the shore-based whiting fishery. Alternative 3 is predicted to generate more information on salmon species incidentally taken in the shore-based whiting fishery than all other Alternatives.

Under Alternative 4 (Combination Monitoring), electronic monitoring system would be used to monitor 100% of shore-based whiting trips. It is expected that the electronic monitoring system would be able to document if a large amount of catch were discarded at sea but it is not expected that the electronic monitoring would always be able to document whether a small amount of catch were discarded at sea. It is also not expected that the electronic monitoring would be able

to document the species composition of catch dumped at sea. Groundfish observers and/or state samplers would also sample 10% - 50% of shore-based whiting deliveries at processing plants to collect such information as species, age, length, weight , number, and maturity from those salmon that are incidentally taken in the shore-based whiting fishery. Alternative 4 is predicted to generate less information on salmon species incidentally taken in the shore-based whiting fishery than Alternative 3 but more information than under Alternative 1 and Alternative 2.

4.3.3 Groundfish Resources

As discussed in Chapter 1, there is an increasing need to accurately track other aspects of the shore-based whiting fishery's bycatch. There are currently eight overfished groundfish species along the Pacific Coast and at least six of these species (widow rockfish, darkblotched rockfish, Pacific ocean perch, canary rockfish, bocaccio, and lingcod) are incidentally taken in the shore-based whiting fishery. Additionally, other groundfish species, sablefish and yellowtail rockfish, are commonly incidentally taken in the shore-based whiting fishery.

The effects of the alternatives (i.e., different monitoring programs for the shore-based whiting fishery) on groundfish resources include both direct and indirect effects The direct effects would include the acquired knowledge and understanding of groundfish incidentally taken in the shore-based fishery. For example, knowledge about whether groundfish are discarded at sea or whether all captured groundfish are delivered to the processing plants. Having this type of information would enable fishery managers to make informed management decisions with respect to managing the total mortality of groundfish, specifically overfished groundfish species. Additionally, sampling groundfish at the processing plants would provide such information as species, age, length, weight, number, and maturity for those groundfish that are incidentally taken in the shore-based whiting fishery. The indirect effects of the proposed action on groundfish resources will depend on how the information collected by the monitoring program is used. For example, if the incidental take of groundfish species, specifically overfished groundfish species, in the shore-based whiting fishery is linked to the location, seasonality, or time of day of fishing activities, efforts could be made to adjust fishing strategies in an effort to avoid capturing non-whiting groundfish species.

Because the proposed action is a monitoring program, all alternatives are predicted to have minimal effects on Pacific Coast groundfish species. However, the effects on knowledge and understanding of groundfish, specifically overfished groundfish species, incidentally taken in the shore-based whiting may vary with the type of monitoring program implemented in the shore-based whiting fishery.

Without any full retention provisions for the shore-based whiting fleet, Alternative 1 (No Action Alternative) would result in the shore-based whiting fleet sorting their catch at sea and discarding all groundfish taken in excess of cumulative limited entry trawl trip limits at sea. Because the shore-based whiting fleet would be subject to groundfish trawl cumulative trip limits, shore-based whiting vessels would be part of the Observer Program's observer coverage plan for the groundfish trawl fleet. Therefore, NMFS groundfish observers would observer approximately 10% of the shore-based whiting fleet in 2005. When groundfish observers are aboard a shore-based whiting trip, they would collect data (i.e., species, age, length, weight, number, maturity) on groundfish species incidentally taken in the shore-based whiting fishery. However, groundfish observers would likely only cover approximately 10% of shore-based

whiting trips, therefore, there would be no groundfish data collected during approximately 90% of the shore-based whiting trips. Alternative 1 is predicted to generate less information on groundfish species taken in the shore-based whiting fishery than all other Alternatives.

Alternative 2 (Status Quo) would continue the sampling regime for groundfish species taken in the shore-based whiting fishery established by the SWOP. There would be no coverage aboard shore-based whiting trips, to verify whether all groundfish species are retained, but between 10% - 35% of shore-based whiting deliveries at processing plants would be sampled for groundfish. Data such as species, age, length, weight, number, and maturity would be collected from those groundfish that are taken in the shore-based whiting fishery, retained, and delivered to processing plants. Groundfish taken in excess of cumulative limited entry trawl trip limits and delivered to processing plants would be available to local charitable food donation organizations. Alternative 2 is predicted to generate more information on groundfish species taken in the shore-based whiting fishery than Alternative 1 but less information than all other Alternatives.

Under Alternative 3 (Federal Monitoring), there would be 100% observer coverage on shore-based whiting trips to verify whether all groundfish species were retained and sampled at the plant or whether groundfish species were discarded are sea. If groundfish were discarded at sea, it may be possible for observers to determine which groundfish species were discarded and to estimate the quantity discarded. Groundfish observers would also sample 10% - 50% of shore-based whiting deliveries at processing plants to collect such information as species, age, length, weight, number, and maturity from those groundfish species taken in the shore-based whiting fishery. Alternative 3 is predicted to generate more information on groundfish species taken in the shore-based whiting fishery than all other Alternatives.

Under Alternative 4 (Combination Monitoring), electronic monitoring system would be used to monitor 100% of shore-based whiting trips. It is expected that the electronic monitoring system would be able to document if a large amount of catch were discarded at sea but it is not expected that the electronic monitoring would always be able to document whether a small amount of catch were discarded at sea. It is also not expected that the electronic monitoring would be able to document the species composition of catch dumped at sea. Groundfish observers and/or state samplers would also sample 10% - 50% of shore-based whiting deliveries at processing plants to collect such information as species, age, length, weight, number, and maturity from those groundfish species taken in the shore-based whiting fishery. Alternative 4 is predicted to generate less information on groundfish species incidentally taken in the shore-based whiting fishery than Alternative 3 but more information than under Alternative 1 and Alternative 2.

4.3.4 Non-Groundfish Species

The effects of the alternatives (i.e., different monitoring programs for the shore-based whiting fishery) on non-groundfish resources include both direct and indirect effects The direct effects would include the acquired knowledge and understanding of non-groundfish species incidentally taken in the shore-based fishery. Having this type of information would enable fishery managers to make better informed management decisions with respect to managing the total mortality of non-groundfish species, specifically coastal pelagic species and groundfish species. The indirect effects of the proposed action on groundfish resources will depend on how the information

collected by the monitoring program is used. For example, if the incidental take of non-groundfish species, specifically coastal pelagic species, in the shore-based whiting fishery is linked to the location, seasonality, or time of day of fishing activities, efforts may be made to adjust fishing strategies in order to avoid capturing non-groundfish species.

Because the proposed action is a monitoring program, all alternatives are predicted to have minimal effects on non-groundfish species. However, the effects on knowledge and understanding of non-groundfish species incidentally taken in the shore-based whiting may vary with the type of monitoring program implemented in the shore-based whiting fleet. The amount of information generated by this proposed action on non-groundfish species is predicted to be the greatest under Alternative 3 (Federal Monitoring), slightly less under Alternative 4 (Combination Monitoring), less under Alternative 2 (Status Quo), and the least under Alternative 1 (No Action Alternative).

Endangered Species
The effects of this proposed action and the differences between alternatives on endangered and/or threatened salmon, marine mammals, seabirds, and sea turtles is discussed in the salmon resources section, the marine mammal section, the seabird section, and the sea turtle section.

Marine Mammals
There is limited information documenting the interactions of groundfish fisheries and marine mammals, but marine mammals are probably affected by many aspects of groundfish fisheries. The incidental take of marine mammals, defined as any serious injury or mortality resulting from commercial fishing operations, is reported to NMFS by vessel operators. In the Pacific Coast groundfish fisheries, incidental take is infrequent and primarily occurs in trawl fisheries (Forney et al. 2000). Additional effects of groundfish fisheries on marine mammals are more difficult to quantify due to a lack of behavioral and ecological information about marine mammals. However, marine mammals may be affected by increased noise in the oceans, change in prey availability, habitat changes due to fishing gear, vessel traffic in and around important habitat (i.e., areas used for foraging, breeding, raising offspring, or hauling-out), at-sea garbage dumping, and diesel or oil discharged into the water associated with commercial fisheries.

Based on its Category III status, the incidental take of marine mammals in the Pacific Coast groundfish fisheries does not significantly impact marine mammal stocks. To date, there are no documented marine mammals takes in the shore-based whiting fishery (B. Wiedoff, Marine Resources Program, ODFW, 2003, personal communication).

Marine mammals species found off the Pacific Coast are either year around residents or transients traveling to feeding/breeding grounds. Because the proposed action is a monitoring program, all alternatives are predicted to have minimal effects on marine mammal species. However, the effects on knowledge and understanding of marine mammals interactions with the shore-based whiting may vary with the type of monitoring program implemented in the shore-based whiting fleet.

The amount of information generated by this proposed action on marine mammal interactions

with the shore-based whiting fleet is predicted to be the greatest under Alternative 3 (Federal Monitoring), slightly less under Alternative 4 (Combination Monitoring), less under Alternative 1 (No Action Alternative), and the least under Alternative 2 (Status Quo).

Seabirds

Interactions between seabirds and fishing operations are wide-spread and have led to conservation concerns in many fisheries throughout the world. Abundant food in the form of offal (discarded fish and fish processing waste) and bait attract birds to fishing vessels. Of the gear used in the Pacific Coast groundfish fisheries, seabirds are occasionally taken incidentally by trawl and pot gear, but they are most often taken by longline gear. Besides entanglement in fishing gear, seabirds may be affected by commercial fisheries in various ways. Change in prey availability may be linked to directed fishing and the discarding of fish and offal. Vessel traffic may affect seabirds when it occurs in and around important foraging and breeding habitat and increases the likelihood of bird storms. In addition, seabirds may be exposed to at-sea garbage dumping and the diesel and oil discharged into the water associated with commercial fisheries.

To date, there are no documented seabird takes in the shore-based whiting fishery (B. Wiedoff, Marine Resources Program, ODFW, 2003, personal communication).

Because the proposed action is a monitoring program, all alternatives are predicted to have minimal effects on seabird species. However, the effects on knowledge and understanding of seabird interactions with the shore-based whiting may slightly vary with the type of monitoring program implemented in the shore-based whiting fleet.

The amount of information generated by this proposed action on seabird interactions with the shore-based whiting fleet is predicted to be the greatest under Alternative 3 (Federal Monitoring), slightly less under Alternative 4 (Combination Monitoring), less under Alternative 1 (No Action Alternative), and the least under Alternative 2 (Status Quo).

Sea Turtles

There is limited information about interactions between sea turtles and Pacific Coast commercial fisheries. Sea turtles are known to be taken incidentally by the California-based pelagic longline fleet and the California halibut gillnet fishery. Because of gear and fishing strategies differences between those fisheries and the groundfish fisheries, the expected take of sea turtles by groundfish gear is minimal. In addition to being incidentally taken in fishing gear, turtles are vulnerable to collisions with vessels and can be killed or injured when struck, especially if struck with an engaged propeller. Entanglement in abandoned fishing gear can also cause death or injury to sea turtles by drowning or loss of a limb. The discard of garbage at sea can be harmful for sea turtles, because the ingestion of such garbage may choke or poison them. Sea turtles have ingested plastic bags, beverage six-pack rings, styrofoam, and other items commonly found aboard fishing vessels. The accidental discharge of diesel and oil from fishing vessels may also put sea turtles at risk, as they are sensitive to chemical contaminates in the water.

To date, there are no documented sea turtle takes in the shore-based whiting fishery (B. Wiedoff, Marine Resources Program, ODFW, 2003, personal communication).

Because the proposed action is a monitoring program, all alternatives are predicted to have minimal effects on sea turtle species. However, the effects on knowledge and understanding of sea turtle interactions with the shore-based whiting may vary with the type of monitoring

program implemented in the shore-based whiting fleet.

The amount of information generated by this proposed action on sea turtle interactions with the shore-based whiting fleet is predicted to be the greatest under Alternative 3 (Federal Monitoring), slightly less under Alternative 4 (Combination Monitoring), less under Alternative 1 (No Action Alternative), and the least under Alternative 2 (Status Quo).

4.4 Effects on the Physical Environment

The effects of fishery management practices on the physical environment typically include such things as fishing gear effects on the ocean floor, changes in water quality associated with vessel traffic, and fish processing discards as a result of fishing practices. Because the proposed action is a monitoring program, all alternatives are predicted to have minimal effects, if any, on the California Current System and essential fish habitat.

4.5 Effects of the Alternatives

Table 2.6.1. A comparison of different full retention and monitoring programs for the shore-based whiting fishery.

Issues	Alternative 1 (No Action Alternative)	Alternative 2 (Status Quo)	Alternative 3 (Federal Monitoring)			Alternative 4 (Combination Monitoring)		
Establishing Retention and Monitoring Requirements	* Shore-based whiting fishery would operate under cumulative trip limits specified in Federal regulation.	* Full retention and monitoring requirements would be specified in an EFP that is issued on an annual basis.	* Full retention and monitoring requirements would be specified in Federal regulation.			* Full retention and monitoring requirements would be specified in Federal regulation.		
Verifying Full Retention of Catch	* Shore-based vessels would sort their catch at sea and discard all prohibited species as well as groundfish taken in excess of cumulative trip limits.	* There would be no monitoring for shore-based whiting trips to verify full retention of catch versus discard at sea.	* Federal observers would monitor 100% of shore-based whiting trips for full retention versus discard at sea.			* Electronic monitoring would monitor 100% of shore-based whiting trips for full retention versus discard at sea.		
			Option 3A(1)	**Option 3A(2)**		**Option 4A(1)**	**Option 4A(2)**	
			* Monitoring program would be Federally funded.	* Monitoring program would be funded by the shore-based whiting fleet through a no cost contract.		* Monitoring program would be Federally funded.	* Monitoring program would be funded by the shore-based whiting fleet through a no cost contract.	
Sampling Prohibited and Overfished Species	* Shore-based whiting vessels would be subject to observer monitoring under the West Coast Groundfish Observer Program's trawl fleet coverage plan. * Monitoring would be Federally funded.	* State port samplers would track and sample salmon and overfished groundfish species at processing plants funded by the shore-based whiting industry and state and Federal management agencies.	* Federal observers would sample 10% - 50% of shore-based whiting deliveries at processing plants for salmon and overfished groundfish species.			* Federal observers and/or state samplers would sample 10% - 50% of shore-based whiting deliveries at processing plants for salmon and overfished groundfish species.		
			Option 3B(1)	**Option 3B(2)**	**Option 3B(3)**	**Option 4B(1)**	**Option 4B(2)**	**Option 4B(3)**
			* Monitoring would be Federally funded.	* Monitoring would be funded by each state.	* Monitoring would be funded by the shore-based whiting industry through a no cost contract.	* Monitoring would be Federally funded.	* Monitoring would be funded by each state.	* Monitoring would be funded by the shore-based whiting industry through a no cost contract.
Tracking Disposition of Overage/Donation Fish	* No tracking of overage/donation fish would be necessary as catch of those species would be discarded at sea.	* State and Federal enforcement staff would share the tracking of overage/donation fish and the money paid for those fish.	* Federal enforcement personnel would track overage/donation fish and the money paid for those fish.			* Federal enforcement personnel and/or state enforcement personnel would share the tracking of overage/donation fish and the money paid for those fish.		
Fisheries Data	* Generates the least amount of fisheries data.	* Generates more fisheries data than Alternative 1 but less data than Alternatives 3 and 4.	* Generates the greatest amount of fisheries data.			* Generates more fisheries data than Alternatives 1 and 2 but less data than Alternative 3.		
Estimated Cost of Monitoring Program	* Cost is estimated at $51,000.	* Cost is estimated at $148,000.	* Cost is estimated at $690,000.			* Cost is estimated at $410,000.		

4.6 Preliminary Assessment of Cumulative Effects

When implementing new full retention and monitoring requirements, it is necessary to consider the cumulative effects on the physical, biological, and socioeconomic aspects of the Pacific Coast groundfish fishery. Cumulative effects are those effects on the environment that result from the incremental effects of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

As discussed in Chapter 4.2 of the EA, the effects of implementing full retention and monitoring requirements in the shore-based whiting fishery on the socio-economic environment of the Pacific Coast groundfish fishery include such things as the cost of the different monitoring programs and the economic effects on the shore-based whiting industry. In addition to the direct costs imposed upon the shore-based whiting industry from changes in monitoring requirements, other recent costs facing the industry include the cost of a vessel monitoring system and landing taxes being paid to cover the loan costs of the limited entry trawl vessel and permit buyback program. Whether the limited entry trawl buyback program results in a net gain or net loss to the remaining fishers has yet to be determined, and therefore, vessels may still benefit from the limited entry trawl buyback program even though landing taxes are being paid. While the proposed action is not expected to significantly affect groundfish fishing fleets and communities, the effects associated with implementing a full retention and monitoring program in the shore-based whiting fleet will vary with alternatives. Over time, the cumulative effects of fishing and non-fishing activities may have an effect on the socio-economic environment. As more information is gathered about the cumulative effects of fishing and non-fishing human activities on the socio-economic environment, additional management measures may be taken to mitigate the effects if necessary.

As discussed in Chapter 4.3 of the EA, the effects of implementing full retention and monitoring requirements in the shore-based whiting fishery on the biological environment of the Pacific Coast groundfish fishery include such things as the tracking and sampling of salmon and overfished groundfish species incidentally taken in the shore-based fishery. Implementing a monitoring program in the shore-based fishery will also affect what is known about interactions between non-groundfish species, marine mammals, seabirds, and sea turtles and the shore-based whiting fishery. Because the proposed action is a monitoring program, all alternatives are predicted to have minimal effects on Pacific Coast salmon species. However, the effects on knowledge and understanding of salmon incidentally taken in the shore-based whiting may vary with the type of monitoring program implemented in the shore-based whiting fishery. As more information is gathered about the cumulative effects of fishing and non-fishing human activities on the biological environment, additional management measures may be taken to mitigate the effects if necessary.

As discussed in Chapter 4.4 of the EA, the effects of implementing full retention and monitoring requirements in the shore-based whiting fishery on the physical environment of the Pacific Coast groundfish fishery are predicted to be minimal. There are no data to suggest that characteristics

of the California Current System or EFH will be affected by a monitoring program in the shore-based whiting fishery. As more information is gathered about the cumulative effects of fishing and non-fishing human activities on the physical environment, additional management measures may be taken to mitigate the effects if necessary.

4.7 "Significance" Considerations

Section 1508.27 of the CEQ Regulations lists ten points to be considered in determining whether or not impacts are significant. Those points are as follows: (1) beneficial and adverse impacts, (2) public health or safety, (3) unique characteristics, (4) controversial effects, (5) uncertainty or unique/unknown risks, (6) precedent/principle setting, (7) relationship/cumulative impact, (8) historical/cultural impacts, (9) endangered/threatened species impacts, and (10) interaction with existing laws for habitat protection. Table 4.7.1 (at the end of this section) summarizes the expected effects of the proposed action and alternatives discussed throughout Chapter 4 of this EA.

1. *Beneficial and Adverse Impacts*. As discussed in Chapter 4 of the EA, the proposed action is not predicted to have significant biological or physical effects, however, it may have significant effects on the socio-economic environment.

Gross Revenues - Information on gross revenues was discussed in Chapter 3.2 of this EA. That information shows available data at the ex-vessel level and describes revenues and revenue sources at the processor level. Changes in gross revenues are only expected to occur under Alternative 1. Under this alternative sorting at sea would be required, leading to more time between hauling and storing the whiting in chilled holds. Since Pacific whiting flesh is highly susceptible to unfavorable storage environments, this would result in cases of lower quality whiting, spoilage, and a decreased price for landings.

Cost Impacts - Very little data exists describing the cost structure of trawl vessels in Pacific groundfish fisheries. The most recent effort used a survey technique to estimate various costs for various vessel categories. Unfortunately, the data collected under this effort was not statistically significant, and therefore, is not being used for analysis in this EA. The most widely used estimate for cost structure is within the Fisheries Economic Assessment Model (FEAM), which estimates regional economic impacts associated with changes in commercial fisheries. The FEAM uses a set of estimates for deriving economic impacts, and one of these estimates is the profit margin of vessels. For this EA, the profit margin for a "Large Groundfish Trawler" in the FEAM is used as the best estimate of a vessels cost structure. This estimate is 10 percent, meaning that an industry funded Option under Alternative 3 could be viewed as having a significant effect on some vessels in the Pacific whiting fleet, since vessel level costs are a substantial portion of this percentage. All other alternatives are not expected to have a significant cost impact.

Net Returns - The net returns to industry are the combined effect of changes in gross revenues and costs. As described above, Alternative 1 is expected to have a significant impact on gross revenues by decreasing the quality of landed catch. Although significant additional costs aren't

imposed on the industry under this Alternative, the decrease in gross revenues will likely have a significant impact on net returns. As described previously, vessel-level costs with an industry funded Option under Alternative 3 are expected to be equivalent to approximately 8 percent of the gross revenues generated by Pacific whiting vessels from Pacific whiting activities. This represents a substantial portion of the estimated 10 percent profit margin for these vessels. Therefore, an industry funded Option under Alternative 3 is expected to have a significant impact on the cost structure of portions of the industry and a significant impact on net returns.

Communities - Community involvement and association with shore-based Pacific whiting activities is largely centered on processing and distribution activities resulting from landed catch, the number of shore-based whiting fishers residing in each community, and the secondary and tertiary economic impacts of revenues associated with those activities. Examples of significant community impacts would be the closure of a large processing plant, substantial losses in residential commercial fisher income, or if large numbers of commercial fishers leave the community. Due to the relatively small number of shore-based Pacific whiting fishers in each community, the diversified nature of most processors, and the likelihood that the shore-based fleet will continue to catch its allotted tonnage, none of the alternatives is expected to have a significant impact on communities.

Consumer Effects - Consumer effects are generally described through changes in consumer surplus. Consumer surplus is measured as what consumers would be willing to pay for a quantity of a particular good above what they are required to pay. An increase in price, or decrease in supply, will reduce consumer surplus. In the case of Pacific whiting, there are many market substitutes including Alaska Pollock, Atlantic Blue Whiting, and Seafin Bream. In many instances, Pacific whiting is an ingredient used in the production of surimi. In other cases, it is used for fillets and head and gut products. When sold on the market, Pacific whiting competes with other substitutes, and on a global scale, Pacific whiting makes up a small portion of that class of products. This means that consumers can easily switch from Pacific whiting products, to another product that is almost identical. Due to this ease of product substitutability, all alternatives are expected to have no significant effect on consumers.

Safety Effects - Commercial fishing is a hazardous occupation with substantial risk. Some studies have been done on the impact of fisheries management on safety, but these studies have focused on major changes with fisheries such as the effect of implementing an Individual Transferable Quota system. Safety improvements are often correlated to actions that eliminate the race for fish, but little is known about whether other changes in the prosecution of the fishery can have the same positive consequences, or negative consequences.

Impacts on Other Fisheries - Many businesses involved in the shore-based Pacific whiting fishery also participate in other fisheries. Chapter 3.2 describes the participation of shore-based catcher vessels in other Pacific coast fisheries. Many of these vessels participate in the general Groundfish trawl fishery, the Dungeness crab fishery, and Groundfish fisheries in Alaska. In addition, several vessels recorded landings of shrimp, coastal pelagic species, and salmon. Diversification is typical of businesses that are seeking to reduce financial risk (spreading out revenues across a variety of sources). Participation in other fisheries can also be seen as profit

maximizing behavior. The intensity in which vessels participate in various fisheries is likely due to potential revenues within that fishery and the stability of those revenues each year. An alternative that changes the profitability of a fishery, or that changes the stability of that fishery may change the composition of the fleet within that fishery. For example, if an alternative makes participation in that fishery relatively expensive, some vessels may choose to not participate in the fishery and focus instead on parallel fisheries since parallel fisheries may appear more attractive when faced with those higher costs.

Under the alternatives presented in this EA, only Alternative 1 has an unknown effect. The impact under this alternative is unknown because it is unknown what the changes in net revenues would be under this scenario, and therefore it is unknown if industry participation will change. Although other alternatives may result in some vessels leaving the shore-based whiting fishery, that number is likely to be small. Therefore, all other alternatives are expected to have no significant impact on other fisheries.

Bycatch and Discard - The Pacific whiting fishery incidentally takes other groundfish and salmon species during directed fishing activity. All alternatives except Alternative 1 require or allow full retention for all species including salmon, which is a prohibited species in other groundfish fishing activities. Full retention fisheries, by definition, increase utilization and reduce discards of incidentally caught species that may otherwise not be landed. Increased retention and utilization can have positive socioeconomic impacts as increased retention may allow for additional production and use of those species by society. Compared to the status quo (which is a full retention alternative) Alternative 3 and Alternative 4 are not expected to have a significant impact. Alternative 1 is expected to have a negatively significant impact on discards since sorting and discarding at sea will be required.

2. *Public health or Safety*. Because the proposed action is a monitoring program, it is not predicted to significantly affect public health or safety. Implementing Alternative 1 or Alternative 3 would involve placing groundfish observers aboard shore-based whiting vessels, however, observing aboard these vessels is not beyond the scope of their job descriptions and should not result in additional safety hazzards. Alternatives 2 - 4 provide for sampling of shore-based whiting deliveries in processing plants by groundfish observers and/or port or state samplers. Once again, these duties are in keeping with their job descriptions and should not result in additional safety hazards.

3. *Unique Characteristics*. As discussed in Chapter 4.3 of the EA, the proposed action is not predicted to jeopardize the sustainability of any groundfish species. In fact, implementing a full retention monitoring program is predicted to generate information about bycatch in the shore-based whiting fishery that will be used for the sustainable management of groundfish species.

4. *Controversial Effects*. Implementing full retention and monitoring requirements in the shore-based whiting fishery is not controversial. However, electronic monitoring is a relatively new technology and there are issues of data confidentiality and ownership of images that new for NMFS and not yet adequately addressed in the Magnuson-Stevens Act.

5. *Unique/Unknown Risks*. The proposed action is not predicted to have any uncertainty or unique/unknown risks associated with it.

6. *Precedent/Principle Setting*. The proposed action may involve some elements of precedent setting as Alternatives 3 and 4 establish 100% monitoring as the level of monitoring necessary to monitor for compliance with full retention requirements and Alternative 4 establishes electronic monitoring as an appropriate tool for monitoring full retention of catch.

7. *Relationship/Cumulative Impact*. As discussed in Chapter 4.6 of the EA, the proposed action is not predicted to result in significant cumulative effects on either the physical, biological, or socio-economic environment of the Pacific Coast groundfish fishery.

8. *Historical/Cultural Impacts*. The proposed action is not predicted to have any historical/cultural effects.

9. *Endangered/Threatened Species Impacts*. As discussed in Chapter 4.3 of the EA, the proposed action is not predicted to have a significant effect on endangered, threatened, or depleted species. In fact, implementing a full retention monitoring program is predicted to generate information about bycatch in the shore-based whiting fishery that may be used for the sustainable management of endangered, threatened, or depleted species.

10. *Interaction with Existing Laws for Habitat Protection*. As discussed in Chapter 4.4 of the EA, the proposed action is not predicted to have a significant effect on habitat.

Table 4.7.1. Summary of the effects of the alternatives on the Pacific Coast groundfish fishery.				
Pacific Coast Groundfish Fishery	**Alternative 1 (No Action Alternative)**	**Alternative 2 (Status Quo)**	**Alternative 3 (Federal Monitoring)**	**Alternative 4 (Combination Monitoring)**
Socio-Economic Environment				
Gross Revenues	S-	N	N	N
Cost Effects	N	N	S-	N
Net Revenues	S-	N	S-	N
Safety	U	N	U	U
Communities	N	N	N	N
Other Fisheries	U	N	N	N
Consumer Effects	N	N	N	N
Bycatch and Discard	S-	N	N	N
Biological Environment				
Salmon Species	N	N	N	N
Groundfish Species	N	N	N	N
Non-groundfish Species	N	N	N	N
Endangered Species	N	N	N	N
Marine Mammals	N	N	N	N
Seabirds	N	N	N	N
Sea Turtles	N	N	N	N
Physical Environment				
California Current System	N	N	N	N
Essential Fish Habitat	N	N	N	N
N= Non-significant Effect; S = Significant Effect; U = Unknown Effect; + = Positive; - = Negative				

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